

THE AUTOMOBILE

Knox Wins Feature Events on Port Jeff Hill



SPORTSMANLIKE, spectacular and satisfactory about describes the first annual hill climbing contest of the Automobile Club of Port Jefferson, L. I., held Saturday on Port Jeff Hill, a short, but trying, incline leading up from the level of Long Island Sound to the wooded crest of the first ridge.

The program of fifteen events filled in splendid style, and of the 90 entered cars, 66 actually competed. The hill is 2,000 feet long, with an elbow turn followed by a terrific grade clear to the finish—a fine test for all the cars.

The aristocratic residents of Port Jefferson turned out in force to witness the stirring contests and the cliff alongside the finish was lined with expensive cars occupied by dozens of prominent society women of New York. They experienced a lot of sensation during the running off of the program, but not a single mishap marred the satisfaction of the day.

A Knox car entered by Gerard and Hall, and driven by Fred Belcher, carried off the premier honors by winning the cups offered for its class, both in price classification and piston displacement, and by finishing third to the two Fiat special cars in the free-for-all. This car covered the course in the latter event in 27:61, while in the 301-450 cubic inches

Knox, Driven By
Fred Belcher

displacement event it won in 28:60. Protest was entered against the winner by J. Bell, who drove the Chalmers in all three events in which the Knox car competed. Of course, the protest was not lodged against the Knox in the free-for-all, as the claim of Mr. Bell was to the effect that it did not measure up to stock car qualifications. This matter will be decided later.

In the first event three Hupmobiles started and the best time was a little over 70 seconds. The Ford won the second event from three small cars. The third race went to the Correja rather easily, and one of the Buicks outclassed its field in the fourth event, winning by about 12 seconds. This car was the only one of the Buick team to have any racing luck during the afternoon. The Matheson entry had an easy time taking the cup in its class, and the Houpt-Rockwell, which has had some difficulty in gaining entry, heretofore, as a stock car, landed the event for high-priced stock cars. The Fiat pair came perilously near somersaulting after the sharp turn in the free for all, showing, by their performance, the big advantage they had in the matter of engine power. De Palma swerved so far in making this turn that his machine seemed to be traveling on two wheels.



Aside from the showing of the Knox car in this race, the feature of it was the performance of The Only Car, an automobile built not far from Port Jefferson. This car is a one-lunger of high power and, of course, had no chance to win anything against its field. But the machine chugged its way to the top of the hill without seeming to be extended, making the course in 40:29, amid the cheers and applause of the Port Jeffersonites.

The other events were won by a Pope-Hartford, Knox owned by Mrs. J. N. Cuneo, Velie, National, another Knox owned by W. J. Fallon, and a Stearns entered by Kingsley Swan, which captured the contest framed for members of the Long Island Automobile Club and the Crescent Automobile Club.

The timing and scoring were done in a thoroughly competent way by F. L. Burges, G. E. Hand, Arthur G. Inderrieden, W. C. Poertner, H. H. Knepper, Steve Fallon, Leslie A. Davis, Chester L. Darling, and Archie Graham. The device was an automatic trip-wire arrangement which was checked by a particularly perfect telephone system.

Frank G. Webb acted as referee and Fred J. Wagner wielded the flag at the start, assisted by Arthur Burnes. Among the list of judges were the following: William J. Gaynor, Henry S. Brush, Willard M. Bayles, Dayton Hedgess, Charles E. Pickett and Luther H. Chambers.

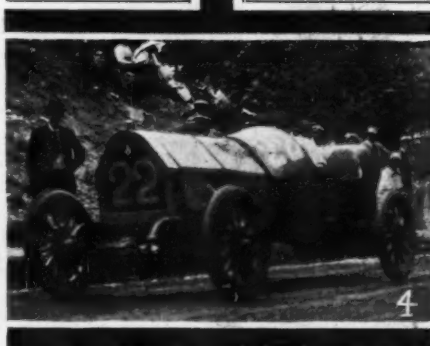
The most closely contested of all the events was that carded as "8A" for cars with less than 300 cubic inches displacement. In this race five automobiles finished within three seconds of one another. The car that was raced most during the day was the National owned and driven by C. M. Rutherford, an amateur. This car started in both the

price and piston displacement classes, the free-for-all and in the amateur event for the Arden Craig Inn cup. In the first it finished a good second to the Knox that was protested, beating two Chalmers cars and a Palmer-Singer. In its piston displacement class it was a close third to the same Knox and the protesting Chalmers entry; in the free-for-all it was seventh, only a trifle over three seconds behind the Knox, which was regarded as the real winner by many of the spectators. Mr.

Rutherford drove to a creditable victory in the amateur cup event. In the event of Bell's protest against the Knox being sustained, Mr. Rutherford will have two firsts and a second. The weather was perfect, the course in excellent shape, the police arrangements fine, and the sport was pronounced by many to have been the best of its kind this year. The officers of the club to whom credit is due for the success of the climb are as follows: Daniel M. Gerard, president; Luther H. Chambers, first vice-president; Charles A. Squires, second vice-president; George E. Darling, secretary, and Charles S. Dickerson, treasurer. The consistent performance of all the cars was commented upon.

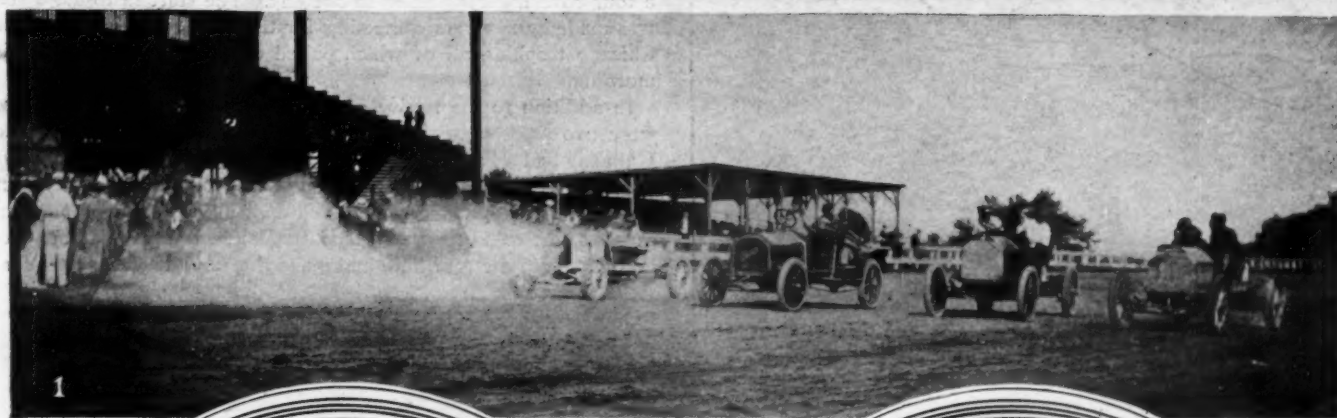
When the Knox, driven by Belcher, won the price classification race for which it was qualified, its time was 30:46; in the displacement classification race which it captured, the same car went under the wire in 28:60. Similarly, Rutherford's National did 30:80, 32:91 and 31:84. The Disbrow Knox did 30:64 and 31:09. Swan's Stearns negotiated two trips in 37:91 and 33:76. In the \$800-or-under event, a trio of little "Hups" finished less than four seconds apart. As a rule those cars which were represented in events under both

(Continued on page 1192)



1—Correja, Winner of Event 3
2—Velie, First in Event 12
3—National, Victor in Event 13
4—"The Only Car," a Big One-Lunger

Mt. Vernon Club's Races Furnished Real Sport



1—Lined Up for the Start
2—The Buicks Had a Successful Day—Three Wins

3—J. M. Boyle's Midland, Second in Westchester Cup Race

UNDER particularly favorable weather conditions, the annual race meeting of the Mt. Vernon Automobile Club was held Saturday at the Empire City race track. There was an attendance of about 1,200, and the program of five interesting events passed off smoothly. The feature of the day's racing was the contest for the Westchester Gentleman's Cup, second on the program. Four elimination trials at five miles preceded the final heat, which was at ten miles. The cars were divided into classes under the piston displacement divisions and the winners in the elimination trials were eligible for the final. In Class C of this event two Buicks were entered and the winner turned up in the car of Russell Smith. Joseph A. Henning protested that Mr. Smith's car was a racing machine and the referee decided to avoid all question by allowing Mr. Henning's car to take part in the final also. The

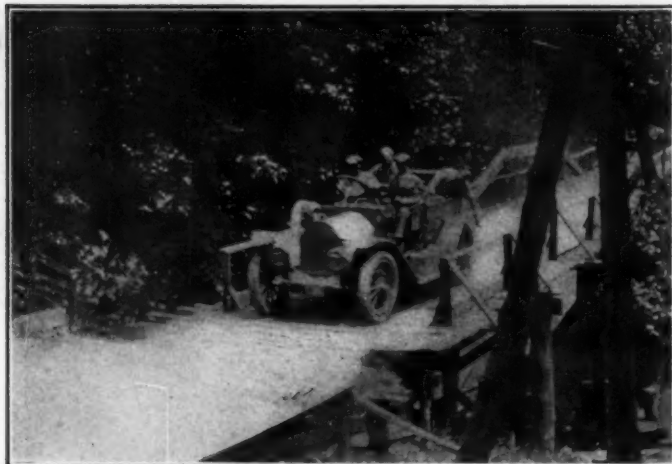
race was won by Spencer Wishard's ancient Mercedes, which has shown sparkling speed in several hill climbs this season. Neither of the Buicks was placed in the final dash.

The last race on the program furnished a bit of sensational work on the part of the winner, Russell Smith's Buick. The race was for the championship of the Mt. Vernon Automobile Club, and Mr. Smith got away flying and was leading at the commencement of the fifth mile when he suffered a blow-out. By a nervy exhibition of strength and cool-headedness, Mr. Smith held the car in the course, and finished first on a flat tire.

The referee was Charles P. Phillips; starter, George A. Lackey; judges, Mayor Edwin Fiske, James M. Gilbert, Frank A. Merrian and Walter F. Stickles. The officers of the club are: Pres., W. H. Mendel; vice-pres., F. A. Merrian, and secretary, L. A. Kissling.



4—Starting the Bunch in the Class A Race



The Cutting, Bisbee Driver, Crossing a Weak Bridge

WICHITA, KANS., June 24—Twelve cars started out and finished in to-day's run of 216 miles from Oklahoma City here and of these twelve seven are Glidden contestants and five are contending for the Chicago trophy. Of the twelve seven made perfect technical scores, these being No. 1, Premier; No. 2, Premier; No. 3, Chalmers; No. 7, Maxwell; No. 100, Moline; No. 103, Lexington, and No. 107, Maxwell.

To-day saw the last perfect road score in the tour pass out of existence when No. 5, Chalmers, driven by W. Bolger, broke a fender iron at 1689 miles from the start at Cincinnati. The fender iron had crystallized and broke with the car traveling at about 15 miles per hour over a smooth road. Bolger immediately stopped and wired it up, being taxed 3 points, or a point a minute for the work. In spite of this the car at present leads in the fight for the Glidden trophy, but the end is not until after the technical examination at Chicago, so it is very problematic as to where the coveted trophy will go.

Four other cars had misfortunes to-day which brought penalties against them. No. 10, Glide, broke a part of the rear-axle housing near Enid, 100 miles out. Another part was secured in Wichita and hurried to the scene so that it was 8 A. M., June 25, before the car checked into here. Its penalty for lateness appears on the chart in this issue.

No. 15, Cino, received 7 points for repairing a broken spring. In the Chicago trophy division No. 101, Moline, took on water seven times because of a leaky radiator and received 21 points. No. 102, Moline, lost 15 points for soldering a radiator leak.

KANSAS CITY, June 25—To-day saw a new record set in

Big Penalties and No Clean

National tours in America and in the entire motor world, namely, a tour covering 234.5 miles in one day. The start in to-day's run was made by five cars competing for the Glidden and five for the Chicago trophies, all of which pulled out of Wichita at six this morning.

In addition to the twelve contesting cars in to-day's run there were two press cars, the Halladay and the Great Western. The Halladay had a bad skid on a highly-arched gumbo road 100 miles out and ran into a ditch, springing the front axle slightly, but it was repaired and the car arrived a little behind the contesting cars. The two Cutting cars and the Wescott press car are expected to join the tour here and make the run into Chicago. Yes-



Ohio, No. 12, Negotiating a Rocky Ford

terday one of the Chalmers confetti cars, which has been lagging behind, after undergoing repairs in Dallas, caught up with the tour and will continue as assistant pilot to Chicago. It is reported here also that the Reo, which has been behind since Hot Springs, will be ready to check out Monday morning on the four-day run to Chicago. Charles F. Van Sicklen, driving No. 106, Falcar, which broke a spring seating on the rear axle entering Dallas, caught the tour Friday night and is running along as a non-contestant. The two Cadillac gun cars are along with the tour, but the Rapid truck has not reported as yet in Kansas City.

Of the twelve contestants nine made the run with clean tech-

TOTAL PENALTIES OF CARS IN GLIDDEN TROPHY CLASS

No.	Car.	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th
1	Premier	0	0	0	0	0	0	4	0	3	0	0	0
2	Premier	0	46	0	86	106	0	10	0	230	156	0	0
3	Chalmers	6	20	0	378	0	0	0	18	3	571	0	20
4	Chalmers	2	6	0	120	0	0	0	6	1012	Continued as non-cont't & confetti car	3	0
5	Chalmers	0	0	0	0	0	0	0	0	0	0	0	0
6	Cole	30	111	0	43	1000	Withdrawn	6	4	43	0	0	0
7	Maxwell	0	0	0	0	0	0	0	0	0	0	0	0
8	Cartercar	0	0	0	432	28	0	728	0	1000	0	0	0
9	Parry	3	3	0	0	20	0	8	155	1000	0	0	0
10	Glide	0	0	0	22	0	0	0	0	104	52	1537	22
11	Ohio	0	135	0	42	114	18	Withdrawn	0	0	0	0	0
12	Ohio	0	111	0	324	1000	Continued as non-contestant	0	0	0	0	0	0
14	Pennsylvania	72	94	0	1338	Withdrawn	0	0	0	0	0	0	0
15	Cino	0	0	0	42	0	50	78	1768	112	82	7	0

TOTAL PENALTIES OF CARS IN CHICAGO TROPHY CLASS

No.	Car.	1st	2d	3d	4th	5th	6th	7th	8th	9th	10th	11th	12th
100	Moline	0	0	5	0	0	0	0	0	3	4	0	0
101	Moline	0	13	0	33	14	0	242	0	3	0	21	74
102	Moline	0	2	0	23	0	0	3	6	3	0	15	4
103	Lexington	0	0	0	105	0	71	1196	0	0	0	0	0
104	Cole	1042	103	0	250	1000	Withdrawn	0	0	0	0	0	0
105	Parry	0	25	26	1000	Withdrawn	0	0	0	0	0	0	0
106	Falcar	60	0	0	57	0	0	26	2	1000	Cont. as non-cont.	0	0
107	Maxwell	0	0	0	14	0	0	11	0	0	0	0	0
108	Cartercar	0	0	2	359	405	896	1000	Withdrawn	0	0	0	0
109	Cartercar	0	556	277	1000	Withdrawn	0	0	0	0	0	0	0
110	Lexington	4	95	0	1000	Withdrawn	0	0	0	0	0	0	0
111	Westcott	3	0	2	117	0	0	1000	Withdrawn	0	0	0	0

Scores in the Glidden Tour

nical scores and three were penalized. No. 3, Chalmers, driven by J. Gardham, received 20 points for replacing a small pin in the gear-shaft connections, requiring 10 minutes for the work. No. 101, Moline, was assessed 74 points for soldering a small leak in the radiator, it requiring one man 74 minutes to do the work. No. 102, Moline, received 4 points, three for taking up some play in the steering gear and one point for loosening it a little.

KANSAS CITY, June 26—To-day has been house-cleaning day with Referee Whiting in the matter of business pertaining to the tour. A protest entered by the Premier company against being assessed three points for taking on water on the ground that the car was acting as confetti car, was settled by the referee



Loading the Cars on the Twice-a-Day Ferry at Helena, Ark.

allowing one filling of water on this score, but refusing to allow a second one. A protest from the Maxwell entry against being penalized for replacing a spring clip which also served as



A Welcome Bit of Good Road Near Lake Cormorant

a part of the shock absorber attachment was withdrawn. A little flurry was caused Sunday morning when Max Parry, of the Parry Automobile Company, appeared before a Federal judge and asked for an injunction to stop the tour on the ground that the referee was refraining from penalizing certain entrants; but the judge refused to grant it, and the matter apparently was dropped. Since then the Contest Board has disqualified the Parry car running as a non-contestant and disqualified the Parry Company from entering sanctioned contests until further notice.

No. 1 Premier, which is leading in the Glidden half of the contest, lost 2 points for putting on a new fan belt. No. 5 Chalmers, which was leading until Saturday, lost 16 points for tightening a valve cap and adjusting a valve-lifter rod. No. 7, Maxwell, had to fit a new spring clip on the front spring, the clip taken off being one made specially for fitting shock absorbers. Moline No. 101 was penalized 6 points for taking on water twice outside of controls, and No. 102 3 points for the same reason. No. 107, Maxwell, lost 20 points in checking out of the control this morning. No. 2, Premier, received 114 points for replacing a left front spring.

Winton Continues Sixes for 1911

JUST as in the past the Winton output will be confined to continuing along well-defined lines, taking advantage of the experience gained, refining as the situation warrants, and remembering that a well-tried friend, even in the form of a mechanism, has attractions that are not necessarily present in an untried innovation. Under the circumstances it is but a normal expectation when the company comes out with its 1911 announcement of the continuance of the "six-cylinder type of automobile that has been an exclusive product of this plant ever since it was found that this character of equipment was what the company wanted to make and what Winton patrons express a preference for."

The six-cylinder motor is given an A. L. A. M. rating of 48.6 horsepower; the cylinder bore is 4 1-2 inches, attended by a 5-inch stroke. The cylinder castings are described as a tough character of close-grain gray iron, and the final finish is by grinding. The cylinders are offset from the crankshaft and are submitted to a hydraulic test of 300 pounds per square inch during manufacture. The connecting rods are long, and the stroke being greater than the bore, considering the offset relation, the work that the motor is capable of doing, without undue wear

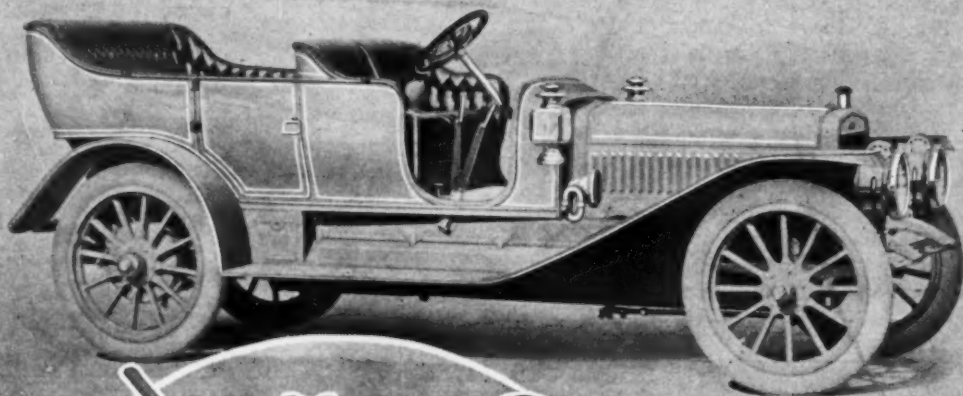
The 48-horsepower self-cranking "Six" without radical change from 1910 practice is tersely described in the Winton literature. The main features are: six-cylinder smoothness; self-cranking; jump spark high tension dual (magneto) ignition system; Winton single nozzle double throttle carburetor; positive water-cooling system; multiple-disk clutch; selective sliding gear; and a conspicuously well-designed screw-and-nut steering mechanism.

or disagreeable sound, is a fair expectation. The piston pins are made of hardened tool steel, and a great effort is made to balance the reciprocating mass in order that the motor will continue to deliver power in proportion to speed, without exceeding the safe limit from the point of view of extreme fibre strain in the section of any of the parts, even though advantage may be taken of the power which is rendered available by speeding the motor up.

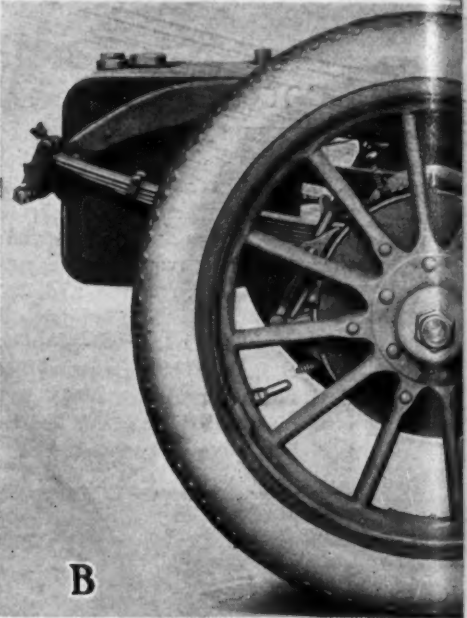
In the Winton plant it is the aim to make all parts interchangeable in order that repair parts may be had at a remote date should the occasion require, with the assurance to the purchaser that the parts will

fit in the place for which they are intended when they are received without having to be tinkered with. The positive-cooling system includes a gear-driven centrifugal pump, designed to afford a liberal supply of water, and among the advance features will be found a new design Winton vertical-tube radiator with "gilled" copper tubes. Attention is called to a long filler for the radiator with a notched hard-rubber cap. The radiator fan is gear driven through a friction clutch, and the air supply leaves a margin of safety against undue heating of the cylinders under severe conditions.

A



B



D

E

F

G

(A)—General appearance of the 48-horsepower touring car, the roominess of which is shown by dimensions as follows:

Driver's Section of the Body:

Distance from dash to seat, 25 inches.
Width of floor, 37 1-2 inches.
Height of seat from door, 14 1-2 inches.
Measurement of the two seats (each), 17 1-2 x 21 inches.
Seating width at top (outside), 54 inches.

Tonneau Section of the Body:

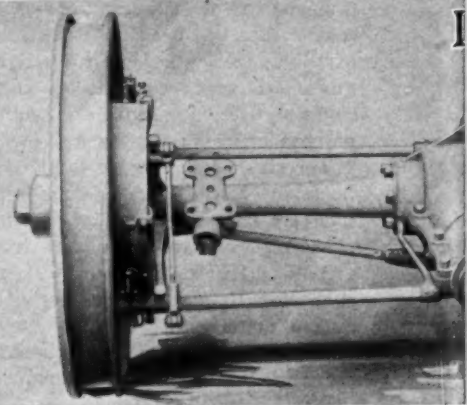
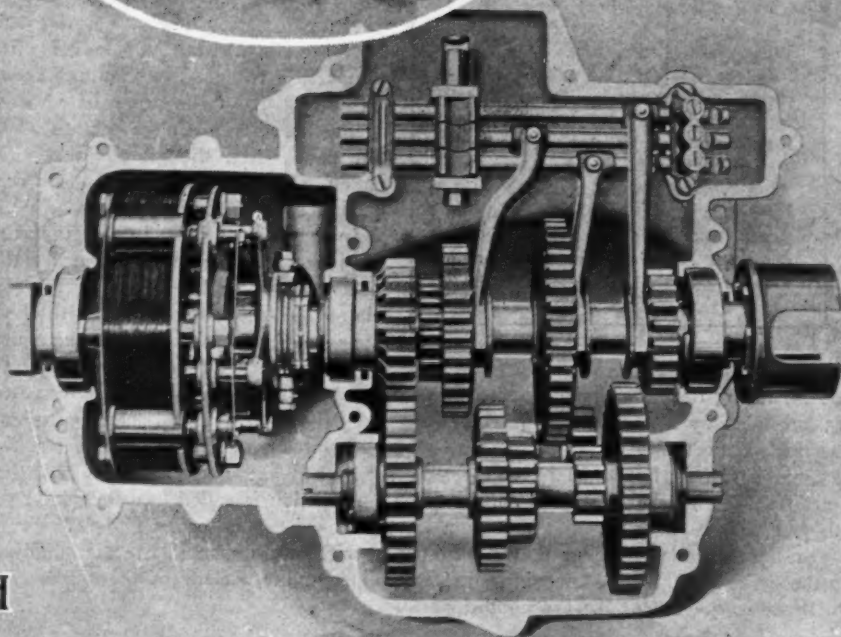
Distance from front to rear seat, 32 inches.
Width of floor, 37 1-2 inches.
Height of seat from floor, 16 1-2 inches.
Seat measurements, 18 1-2 x 50 1-2 inches.
Seat width at top (outside), 59 1-2 inches.
Width of doors, 20 inches.

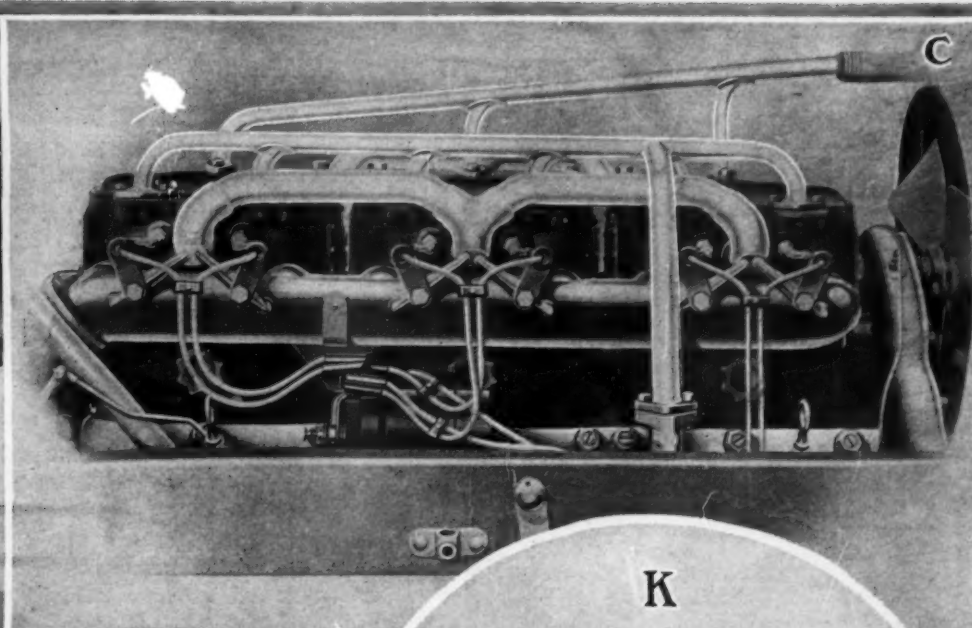
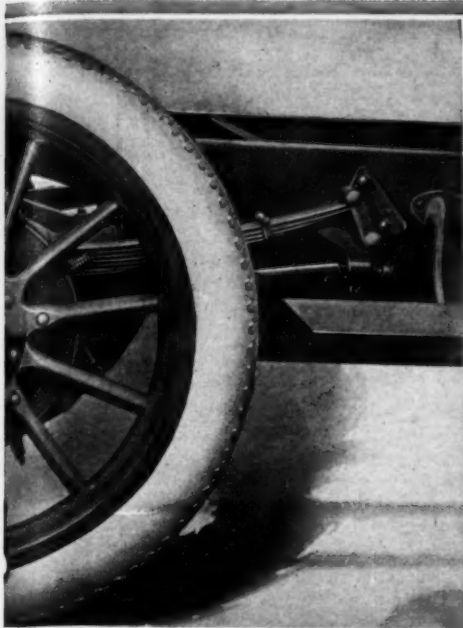
(B)—Long half-elliptic rear springs shackled at both ends; 36-inch tires; wooden wheels; front tires being 36 x 4, and rear 36 x 4 1-2 inches, with Goodrich Quick Detachable Rims; tire inflation is accomplished by special means, in connection with the self-starting mechanism, which includes a tube shown at D, and a self-starting cock F which is located on the dash, and fitted with a pressure gauge. A 22-gallon gasoline tank is shown at the rear end of the chassis, and it contains a 3-gallon reserve supply so arranged that it can only be used after the main supply runs out.

(C)—Right side of the six-cylinder motor showing the position of the magneto, well executed work on the manifolds, secure method of installing the high-tension wiring, and other characteristic features.

(G)—Winton carbureter of the single-nozzle type, double throttle, with means for combination operation. Gasoline enters the

H





carburetor to the float chamber, passing through a strainer. A hot-air tube is provided to facilitate cold weather starting, and the carburetor is placed on the side opposite to the valves, thus assuring a homogeneous mixture, the distance being sufficiently long to give the entrained gasoline mixing time. A carburetor primer is fastened on the dash.

(H)—Transmission gear and multiple disc clutch with the cover off, affording a clear view of the relations. The speed table of this gear based on 1000 revolutions per minute of the motor is as follows:

Speed Table in Miles per Hour at 1,000 R.P.M.
36-inch Wheels.

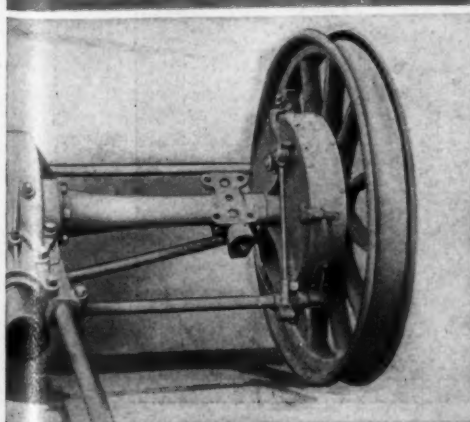
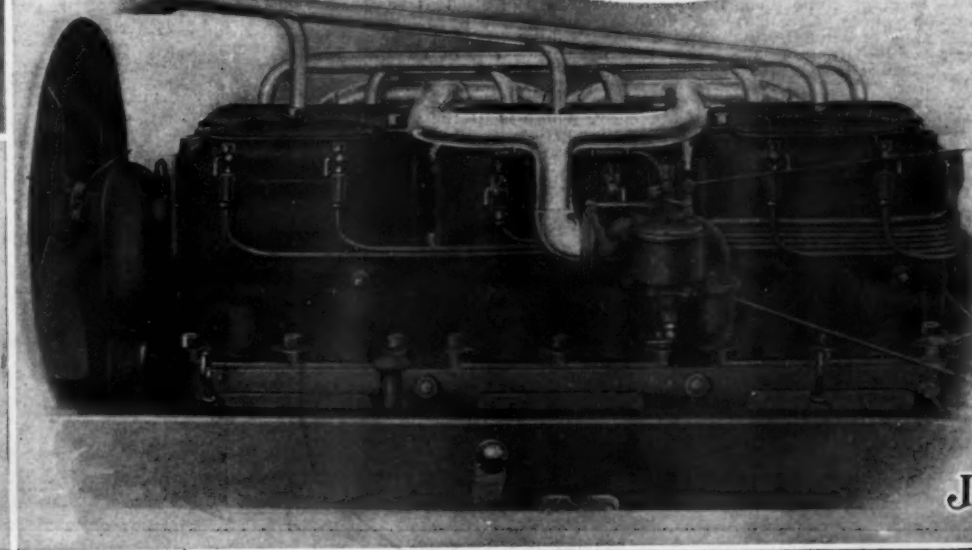
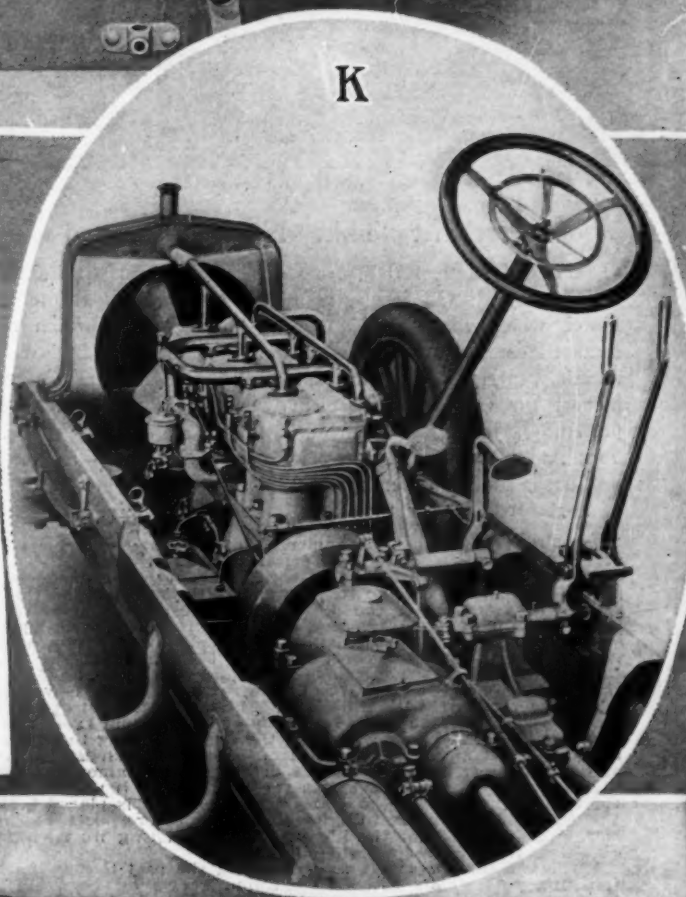
Gears	3.69	3.2	2.94	2.64
1st Speed.....	9.33	10.76	11.73	13.01
2nd Speed.....	20.10	23.20	25.27	28.04
3rd Speed.....	29.00	33.47	36.46	40.46
4th Speed.....	36.48	42.10	45.86	50.89

To find the speed at 1500 R.P.M., add one-half.

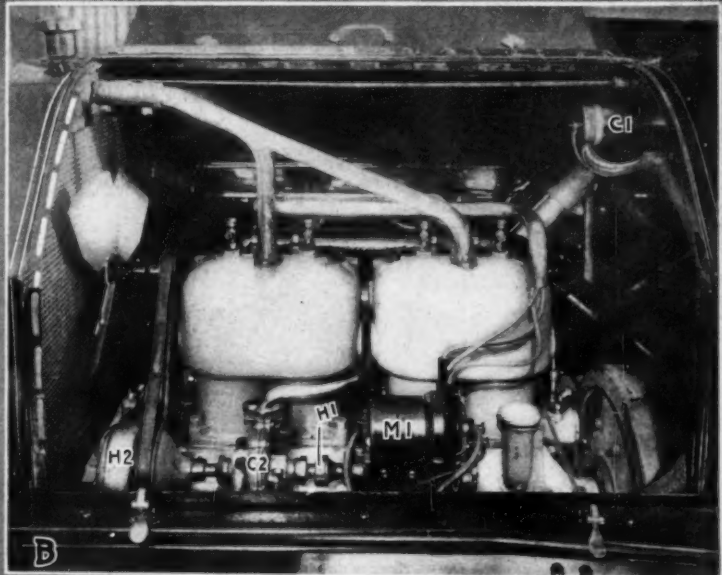
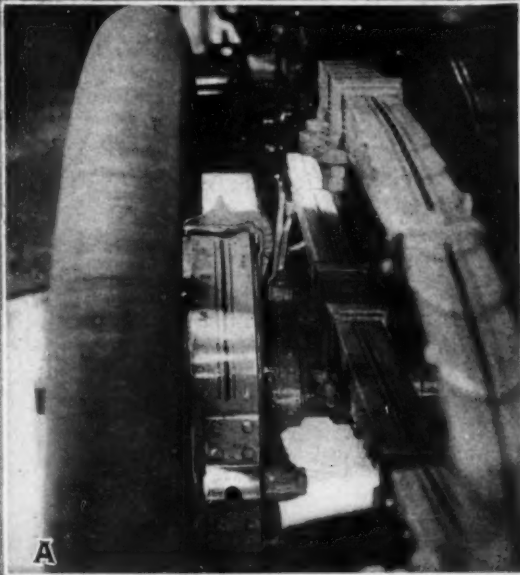
The multiple disc clutch, which is within the transmission gear housing, is tested to hold 90 horsepower at 1000 revolutions per minute. There are 67 saw-steel friction discs; 33 are attached to the transmission shaft, and 34 to the driving spindles which are attached to the flywheel. The discs revolve in an oil bath.

(I)—Live rear axle, showing the method of trussing, anchorage of the torsion rod, universal joint of the propeller shaft, large diameter brake drums closed in for protection against mud accumulations and an external constricting band brake system, in addition to the in-

(Continued on page 1194.)



Device, Transmission Gear, Multiple Disc Clutch, Live Rear Axle, Spring Suspension, and a Bird's-eye View of the Power Plant



Carhartt "Thirty-Five" Introduced

AUTOMOBILE ROW, New York, was entertained on June 22 by R. C. Kelsey, who gave a luncheon at the Plaza Hotel, which was attended by the "Old Guard," which represents the metropolitan press, and a notable sprinkling of automobile experts. After the spread the guests were invited to inspect the Carhartt "Thirty-five," which is an automobile of pretention, just from Detroit, and the staff photographer of THE AUTOMOBILE came away with the illustrations as here reproduced, thinking, perhaps, that autoists prefer to see details of a new car, rather than to admire a perspective:

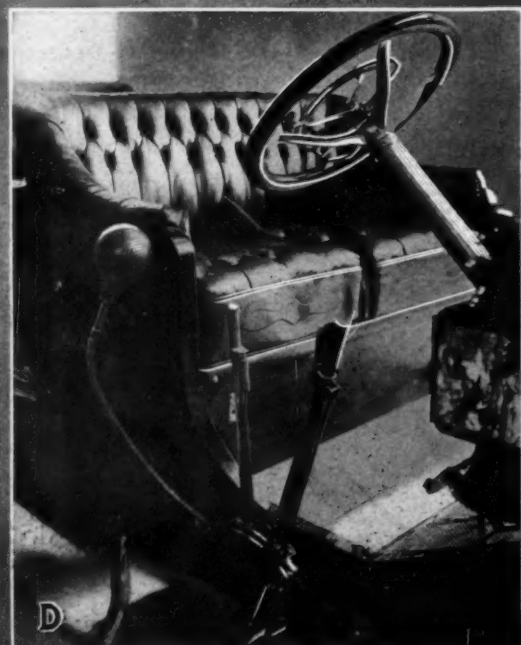
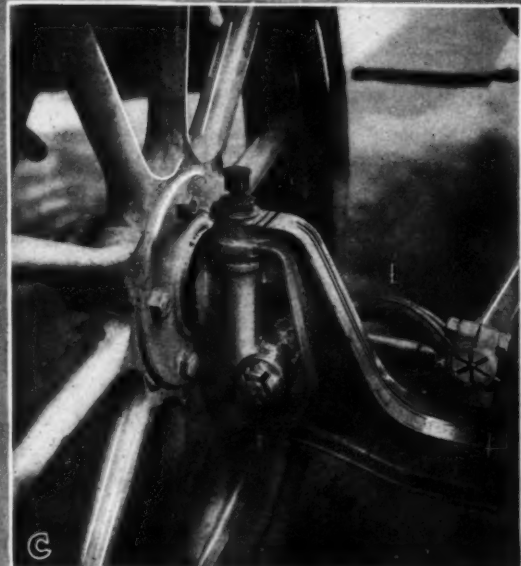
(A) The rear spring suspension is of the three-quarter elliptic type, with a sufficiency of wide plates secured by double U-bolts on a swivel perch. The axle is of the Timken type of the most approved form, with Timken roller bearings throughout, and the unit system of assembly of the differential gear and bevel drive; the brake drum is of large diameter, and the external constricting band shows clearly in the illustration. The wheels are 34 x 4-inch, artillery type, with 118-inch wheel base, and 56-inch tread.

(B) Left side of the Continental motor, which has an A.L.A.M. rating of 28.9 horsepower. It is of the 4-cylinder type, 4-cycle principle, water-cooled, with a bore of 4 1/4 inches, and a stroke of 4 1/2 inches. The magneto M¹ shows; it is of Bosch Dual type, and the auxiliary coil C¹ protrudes through the dash, bringing the wiring to a point of vantage, so that the electrical installation is substantial and get-at-able. The magneto is driven by the same shaft which meshes with the timing gears in the housing H²; it passes through the centrifugal pump C², and an Oldham joint H¹ is placed between the centrifugal pump and the magneto. In other respects, the motor is shown so clearly in the illustration, considering its well-known qualities, that discussion will be reserved.

(C) The front construction, considering the part that is most interesting to autoists of discrimination, shows an I-section drop forging in one piece from suitable grades of steel; it is of the Timken make, with Timken roller bearings in the hubs, and the Elliott type of knuckle, including a long through knuckle pin, and means for lubrication. The cross and drag rods are of substantial construction, straight line design, with large diameter balls in the universal joints, means for adjusting and locking, as the importance of the situation demands.

(D) Shows the part of the body, which is of the greatest importance from the point of view of operation. One of the side levers is for the emergency brakes, and the other is used in the manipulation of the Brown-Lipe transmission gear system of the three-speed selective type. The steering wheel, of large diameter, is given an agreeable rake, and the relation between the seat, the wheel, the foot pedals, and the spark and throttle levers is that which accords with the most accepted practice.

The side frames are of the Parish & Bingham make, channel section, and throughout the car, which is an assembled product, each unit is of some well-known manufacture as Gemmer steering gear, etc. The body, as shown at the Plaza, was of the touring type, metal and wood construction, seating five passengers; with hand-buffed leather upholstery, and workmanship to match. The general appearance of the car is highly artistic; price \$2,250 with top and accessories.



Abstracts from the 50 Best Foreign Papers

Digest Along Technical Lines for the Engineer

It is demanded of lubricating oils that they shall not attack metals, that their chemical composition shall not be altered by high temperature and above all that they shall not contain oil of resin. For the latter requirement no other reason is given than that perhaps the oil of resin is more volatile than the rest and may contribute to "cracking" as well as increase the total consumption. Its density is however, 938, while the pure mineral oils with which it is found mixed have a specific gravity of only 900 to 925. In practice scarcely any other means are employed for testing lubricating oils than to use a sample of one for a day's journey, to force the speed of the vehicle and to examine in the evening the metallic surfaces and the residues. A chemical test has fewer inconveniences. The lubricating oils usually belong to the paraffine group of petroleum distillates. They are always thick and brown, but of a shade varying with the angle of the light. They get thinner with heat and are finally evaporated into thick fumes, as one may observe by heating a drop on a piece of paper over the flame of a candle. They are easily soluble in ether and this permits a ready examination for foreign corpuscles, and gives a chance for dosing them chemically. Every insoluble ingredient is at least suspicious and everything infusible is harmful. Only graphite, among infusible ingredients, is tolerated on account of its lubricating properties. But one should be circumspect with regard to graphite, partly because there are gritty and impure brands in the trade, and partly because this substance lends itself to other adulterations. At any event, the adulteration with oil of resin remains always the most difficult to detect, and it is a practical method to this end which is most required. The method proposed rests upon the colored reaction for resin given by Mr. Sans of the Laboratory for Resins at Bordeaux (*Annales de chimie analytique*, 1909; page 100). The author describes it as follows: "If a very small quantity of resin is added in a test tube containing one or two cubic centimeters of neutral sulphate of methyl, and the tube is slightly heated, there is observed a coloration passing from rose to violet and deep violet and which disappears when the temperature is raised, leaving only a slight brownish shade."

Under similar conditions slight traces of oil of resin give practically the same reaction, without reaching the deep violet, however. If the oil is emulsified in water, the reaction is plain without heating. But if it is dissolved in alcohol, no coloration appears. To apply these properties to a test, one proceeds as follows: Pour 3 to 5 grammes of the suspected oil in a tube, and on top thereof about five times as much of 60 proof alcohol; close with a stopper and heat in a wet-bath to 40 to 50 degrees centigrade, so as to render the oil more fluid, and shake until an emulsion is formed. This is now cooled in water, and fatty globules separate themselves from the medium. By turning the tube gently up and down three or four times, the globules are made to form a single mass, which rises to the top or sinks to the bottom of the liquid, according to the specific gravity of the oil. The whole contents are now thrown on a filter, and the liquid runs off rapidly and is received in a capsule, which is heated in a wet-bath until the alcohol alone has disappeared, and the residue is then allowed to cool. If then, into this water without alcohol, there is dropped sulphate of methyl the appearance of red color shows the presence of oil of resin. The color vanishes rather quickly after the first few drops, but, by adding more, up to 2 to 3 cubic centimeters, the

It is demanded of lubricating oils that they shall not attack metals; chemical composition must not be altered by temperature; by using ether as a solvent oils may be examined to advantage; oil of resin is difficult to detect; method of locating resinous oil is given; buncombe in the formulae used in aeronautical discussions; acetylene is promising in the production of synthetic rubber; comparative tests of cooling by water and by mixture with higher boiling point.

color reappears with increased intensity and more lasting. It should be remembered that there will be no reaction with alcohol 90 to 95 proof. Even with the use of 60 proof alcohol it is reduced, and it may not appear if the desiccation of this alcoholic extract is complete. The use of 60 proof alcohol is necessary so as to avoid any dissolution of the paraffine oil, and the preservation of the water in this alcohol, after one-half its volume has been evaporated, is required to get the most sensitive reaction. Synthetic experiments with this method have shown that it will detect an admixture of one per cent. or

even less of resin oil to a lubricant.—*Les Sports*, June 8.

"At the present stage of hydrodynamics, direct and quantitative application of theoretic knowledge to aeronautic construction problems is rarely possible. Only qualitative explanations of a general nature and experimentally ascertained figures are in question." In other words, without circumlocution, most formulas relating to flight problems and pretending to give mathematical relations of the forces involved in atmospheric thrusts are as yet buncombe. From an article on the present stage of the "science of aviation," by Diplom-Engineer F. Bendemann in *Zeitschrift des Vereines Deutscher Ingenieure*.

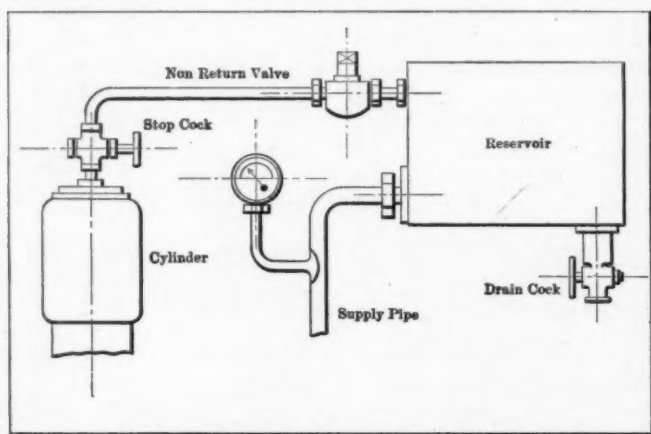
Acetylene is one of the substances promising best results in the production of synthetic rubber, and there is some hope in this fact for the languishing calcium carbide industry.—*Engineering* (London), May 13.

A cooling medium boiling at 170 degrees centigrade instead of 100 degrees, as water, and suitable for use in the water-jackets of automobile engines, has been devised by Mr. Boursin and tried out in a long series of experiments at the Conservatory of Arts and Trades. For example, a motor was first operated cooled to an exterior temperature of 168 degrees by means of Boursin's mixture, and a quarter hour afterwards the same motor was cooled with water. Observations were first taken after one hour of running. The average r.p.m. was 1130, the power 4.22 hp., the gasoline consumed in two hours 3.054 kilograms. The metal radiator maintained a constant temperature of 40 degrees. With water in the jacket, observation was commenced when the water had reached 93 degrees. The chief of the laboratory advanced the ignition two notches. The r.p.m. was 1160, the power 4.25 hp., the consumption of gasoline 3.557 kilograms. With about equal power the gasoline consumption with water cooling had increased 16 per cent. At a renewed trial with the new cooling mixture, 3 millimeters was added to the lift of the exhaust valves, and the gasoline consumption went down to 2.700 kilograms, while the power was somewhat increased. From these tests one may draw some conclusions. The temperature of the exhaust is raised, fewer calories are absorbed by the walls and the efficiency is increased. Hence, to get all the advantages offered by using a cooling medium of high boiling point, reduce the length of the suction stroke while keeping the compression unchanged, and the fuel economy will be improved. Or, if it is desired to increase the power at equal fuel cost, increase the areas of the ports. In fact, ports sufficient for a water-cooled motor are no longer sufficient for a motor working at higher temperatures, whether through air-cooling or use of a cooling medium like Boursin's. In the complete reports of this investigator, a theoretical accounting for the various heat losses under the different conditions is promised.—*La Vie Automobile*, June 11.

Helpful Hints for Those Who Drive

MANY an automobilist has wished for a self-starting device, and has scoured the market in search of one, without success. Similarly there are many who desire a source of pressure, such as is not supplied with the car. This want can be supplied by any handy man who can select materials and fit them to his car in a proper manner, a contract which nearly any real American would undertake.

The materials necessary to make and fit to the car the source of pressure supply shown in the appended cut are few, consisting of a stout tank of perhaps two to three cubic feet capacity. In addition to this, there is needed a stop cock, a non-return valve, a drain cock for the tank, a gauge, and the necessary lengths of heavy copper tubing of 1-4 inch or smaller diameter. The stop cock is screwed into the top of the cylinder, and a pipe leads from there to the tank, located in any suitable and convenient place. Just ahead of the tank is placed the non-return valve, to prevent the pressure from escaping back to the cylinder during the suction and other strokes when the pressure is likely to be lower than that in the tank. The drain



Elements of Pressure Storage System of Utility

should be fitted to one end of the tank, near or at the lowest point, so as to draw off the water of condensation.

From another point of the tank the pressure gauge is led, and, also, the supply pipe. If the pressure is to be used for pumping tires, for cleaning off dust, or for blowing the horn, the pipe would naturally lead forward to somewhere near the dashboard. On the other hand, if the automobilist is ambitious and wants to fit a starting device, the supply pipe should lead to a distributor placed directly upon the dash.

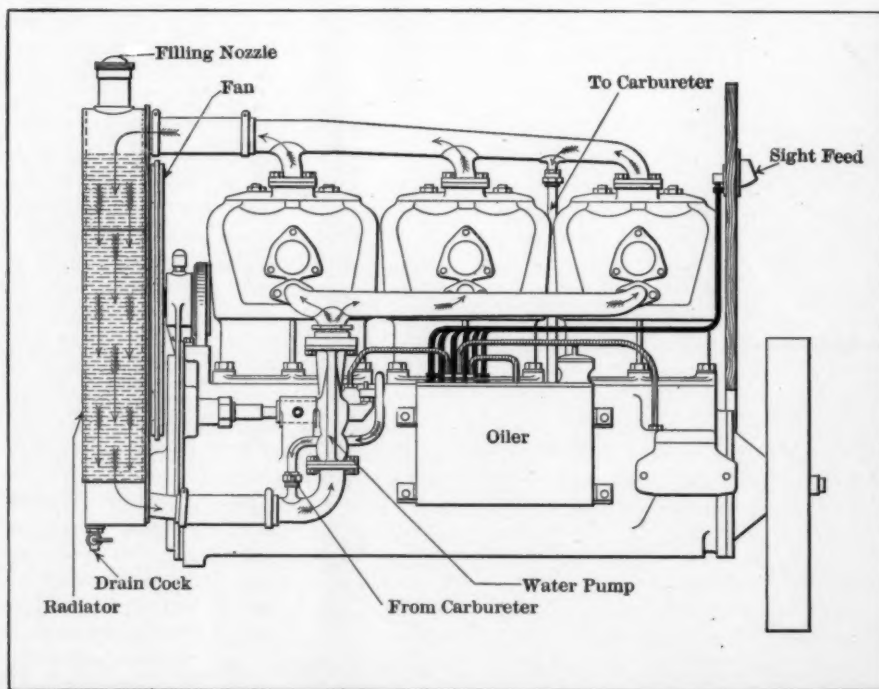
The pressure gauge, although shown close to the tank, would preferably be located on the dash and fastened to it, this being only a matter of piping.

Lost motion takes place when relative parts are lacking in harmonious adjustment. The effect of lost motion in any machine is usually to rack the machine to pieces long before it would wear out if proper attention were given to the alignment, lubrication, and adjustment of its parts. Where there is lost motion there is often danger; excessive wear, noise, and inefficiency are its accompaniments; and

many a serious accident has been traced directly to neglected lost motion in the steering gear. "Why is the repair shop so very prevalent?" The answer may be, "Chiefly because of lost motion." The life and safety of any bearing decrease as the lost motion increases. Therefore, do not neglect lost motion.

It frequently happens that a horn becomes dented. To restore it to its normal shape it is usually sent to a musical-instrument maker or to the manufacturer of the horn, which is not only expensive but also involves considerable loss of time. By the following method dents can be removed from the "bell" of a horn in the garage or at home. The materials necessary are a length of strong half-inch wire, solder, a blow torch and vise. The wire is bent into a loop of about the size of the dented portion at one end and is then soldered to the dented portion. The wire is then gripped in a vise or wrapped around another piece, to prevent the wire running through the jaws of the vise. The horn is now grasped with both hands, and a series of gentle pulls in the direction of the arrow will bring the bell to its original contour. The solder is then melted with the blow torch, when the wire loop comes away, and the operation is finished, except for polishing.

Amateurs really should learn to take care of the component parts of the water system. The diagram below shows the whole water system of a well-known car, in which the water is filled into the usual filling cap, flows downward and back to a centrifugal pump, is there projected up to the bottoms of the cylinders, whence it carries off the heat, loses in specific gravity, rises and flows out through the upper water pipe to the top of the radiator, where it is cooler, and starts over again. In this system, the two hose pipes at the top and bottom of the radiator should be frequently inspected, and often replaced, this being a very small expense. The gaskets at the junction of the upper and lower pipes with the cylinders, six in number in this case, should also be inspected and replaced frequently, while the small pipe shunt to the carburetor must be taken off and cleaned out at frequent intervals; it easily fills with slime and sediment.



Complete Water System of Thomas Six-Cylinder Car, Showing Where Care is Needed

Rejuvenating the Old Automobile

By G. J. MERCER.

CONFORMING to the shape of the bonnet of this car and with a view to obtaining the most artistic appearance the dash is considerably lower than the dimensions which obtained in the previous examples, and the overhang is given a flare to match, taking into account at the same time the shape of the fore-doors which match up with the appearance of the side doors leading to the tonneau. Fig. 9 is a side elevation of the effort complete. Fig. 10 represents the structural detail of the framing and fore-door. Fig. 11 is a front elevation and Fig. 12 is a plan of the work which will have to be done upon the body in the process of reconstructing the same to include the fore-doors.

The material specified is 16-gauge sheet aluminum over the

Illustrating a modern fore-door type of body as it would appear on a Chalmers "Thirty" touring car, giving all information required by a body maker and showing how the body will appear when completed. In this case the side lever for sliding the gears comes inside of the fore-door on the right-hand side of the car, and the emergency brake lever falls to the outside.

autoist to utilize the fore-doors in periods of inclement weather and to avoid the coupé-in feeling during periods of calm.

Referring to Fig. 11 the dotted lines of the speed-change lever indicate how it must be bent in order that it will pass through an opening of the body to the inside at a point above the quadrant. In this car the quadrant is not only high up but falls to a considerable distance outside of the line of the chassis frame. This necessitates a rather deep cut in the body, and in order to create a somewhat better impression than would otherwise obtain, this cut may be housed over. The throw of the lever is relatively short, which is a fortunate circumstance, since it reduces the dimensions of the housing and makes it possible to consider having the side

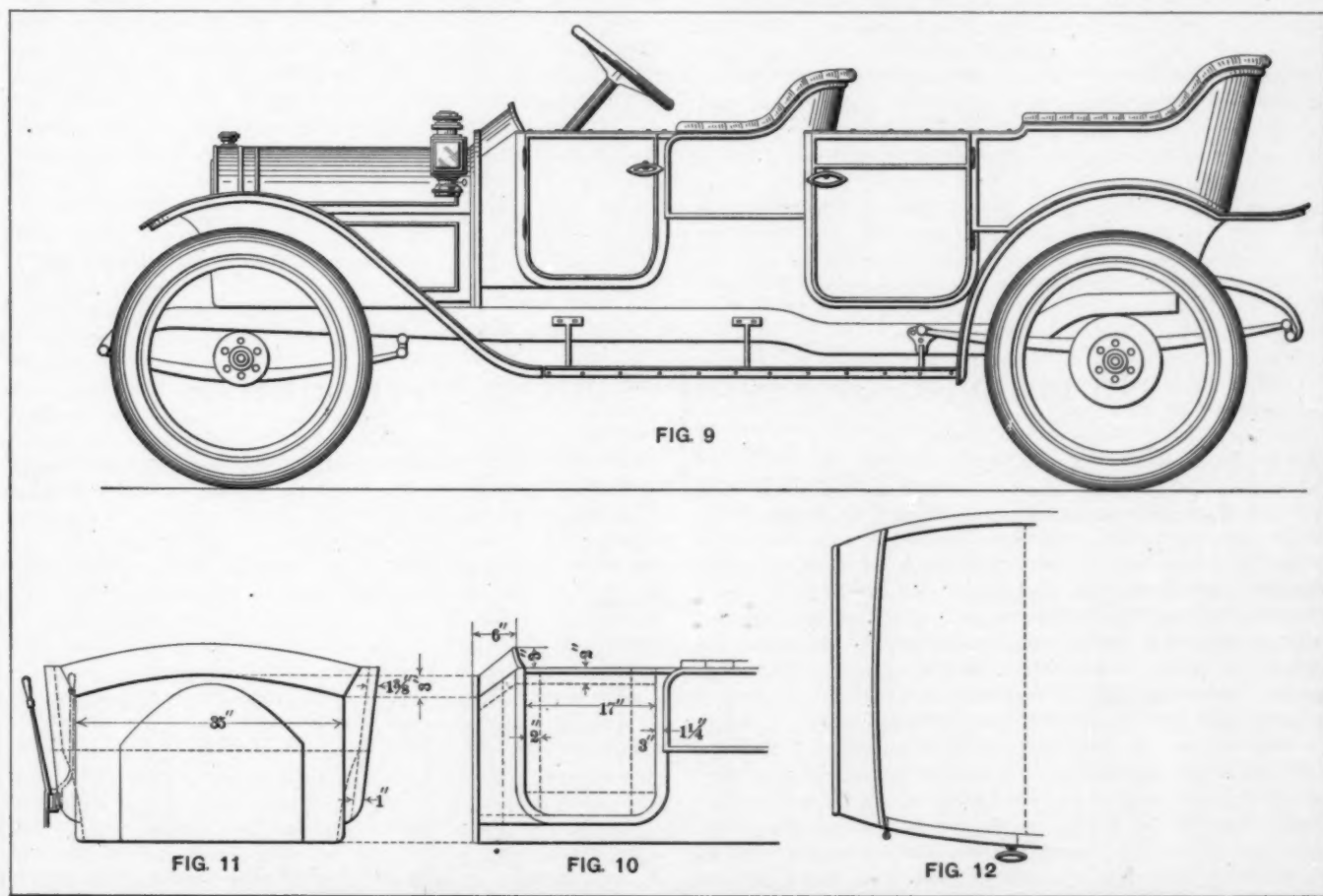


Fig. 9—Side elevation of the rejuvenated body. Fig. 10—Side elevation of the fore-door. Fig. 11—Front elevation. Fig. 12—Plan.

wooden framing. The pillar to form the doorway as shown in Fig. 10 is a U-shaped bent wood piece, framed against the seat, side, front, and to the underbody. The pillar is continuous for the whole distance up the front of the door, and the metal side panel is grooved into the same, rather than to have it finished on the outside. At the bottom a horizontal framing piece is fitted in between the pillar and the dash. It is also necessary to frame the duster moulding into the pillar, when the latter is assembled to the underbody. The doors are hinged, and it is recommended that they be swung in a substantial manner, although an opportunity will be offered to select the character of hinges which will permit of detaching the doors at will; this is a modern idea, and it offers the advantage of permitting the

lever for the sliding gears fall to the inside. It is a much more convenient arrangement.

Rapid System of Finishing Bodies

Clean surface thoroughly, apply primer, work to smooth finish, sandpaper surface ending with No. 0; dust off. On the third day apply opaque color, then ground-work color; when dry apply coat of glaze, rub lightly with a roll of broadcloth dipped in water, and No. 00 pulverized pumice stone to kill gloss. Apply coat of elastic rubbing varnish, then rub with pumice stone and water. About the eighth day, apply coat of clear elastic rubbing varnish, slick down with pumice stone and water, wash up and finish with a rich full body varnish.

Vulcanizer Thermometers Frequently Deceive

By JAMES S. MADISON.

THE manufacture of thermometers for use in cases where accuracy and precision are required has reached a high state of development. Thermometers used for purely scientific purposes leave small room for improvement. This is especially true of instruments made by a reliable manufacturer, and afterward standardized and certified by the Reichs Anstalt in Germany, or by the United States Bureau of Standards at Washington. Such thermometers will give the exact temperature through a range of 100° or more, with a variation of only one-tenth of a degree. Because of the care with which they are made, calibrated and tested they are naturally expensive. But the ordinary thermometers, certainly the cheaper varieties, are never accurate and should always be tested before using. The small tube thermometers used in connection with the different forms of vulcanizers should be tested, since many of them are so inaccurate as to lead to disastrous results.

One of my acquaintances recently purchased an electric vulcanizer. He used it to repair cuts in his casings, etc., each time carefully following the directions of the manufacturer, as to the time and temperature of heating. He was particularly cautious not to allow the temperature to go above the danger point, 265°-275°, as stated in the directions for vulcanizing. Several days after he noticed that the casing upon which he had been working was developing an incipient blow-out in three different places. Not only was the rubber tread burned, but the fabric was also burned and had begun to bulge out, and would have blown out in a very short time if the casing had not been removed from the rim. An examination showed that it was ruined.

The thermometer in question and one belonging to the writer were taken to the laboratory of a neighboring college and tested by comparing with a standard thermometer. The test was carried out as follows: The standard and the two vulcanizer thermometers were suspended in a glass beaker nearly filled with cylinder oil. This was supported on a wire gauze over a tripod and heated with an ordinary Bunsen burner. The readings were taken at 250°, 265°, 275° and 280° with the following results:

Standard F°	A F°	B F°	Error A F°	Error B F°
250.	267.0	268.0	+17.0	+18.0
265.	283.5	282.0	+18.5	+17.0
275.	293.0	290.0	+18.0	+15.0
280.	302.0	302.0	+22.0	+22.0

From these figures it is obvious that when the thermometer read 275°, the temperature was at least 18° higher. It is also obvious that one should not rely upon the ordinary thermometer implicitly. It is also important to remember that even if the thermometer be approximately correct, it will not necessarily give a reading of the right temperature of the vulcanizer at the point of contact between it and the tire. In some forms of vulcanizers the thermometer is supported by a shoulder at the extreme edge of the instrument. In view of its distance from the center, and the quantities of heat that are lost by radiation, etc., the temperature actually shown by the readings is, in all probability, lower in every case than the real temperature at the center of the vulcanizer, the usual point of contact between it and the tire. If the thermometer were placed at the center, it would not be at all surprising to find that it would read from 10°-15° higher than it does at the edge.

Importance of Proper Timing Overlooked

WHEN an automobile has been in service for awhile the timing falls away from its correct position a little in the better types of motors, and to a considerable extent in the average of them. Some motors are provided with systems of adjustment so that the re-timing problem is reduced to a minimum, but the autoist who undertakes to time his own motor without understanding the intricacies of the problem has one chance in his favor and 99 against arriving at the right conclusion. Since two-cycle motors cannot be timed after they leave the maker's hands the discussion here will be confined to the four-cycle types of motors, and referring to Fig. 1, which is a diagram of the four-cycles, it will be observed that the wavy line which starts at O, which is the atmospheric line (14.7 pounds per square inch at the sea level), sweeps upward during the expansion stroke, crosses the atmospheric line at the end of that stroke, falls below O during the back pressure period, and if the muffler is of the ejector type, rises above the line approaching the end of the exhaust stroke; but when the suction

stroke comes on, a depression is generated which represents a loss in the total power summation, which depression usually reaches O at the end of the suction stroke and is followed by the compression stroke, which represents a power loss throughout, varying with the compression. This curve is made without considering the increase in pressure which is due to ignition and expansion, so that the pressure in pounds per square inch, as shown, is that which would obtain were the motor run as a compressor in the absence of the ignition phenomena.

The power which may be taken from a motor will be indicated by the area of the enclosure embraced by the atmospheric line at the bottom and the upward sweeping curve, starting and ending at O on the expansion stroke, plus such portions of the curves of the exhaust, suction and compression cycles as may sweep above the zero line, diminished by the areas represented by the curves which sweep below the line in the exhaust, suction and compression cycles. The great problem under the circumstances lies in so timing the motor

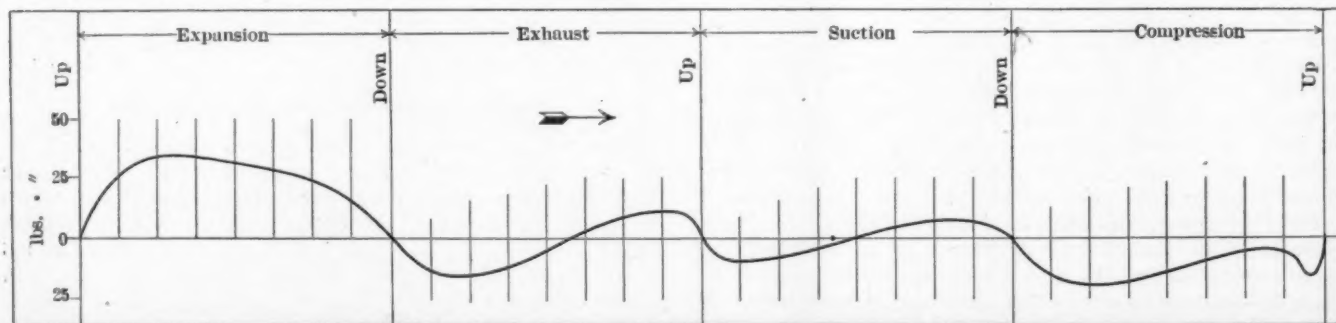


Fig. 1—Curve plotted to show the compressor action of an automobile motor, and the variations of pressure during the 4-cycles

that it will give the greatest possible power value during the expansion stroke and a minimum of the pumping losses during the exhaust, suction and compression strokes.

Fig. 2 shows the markings on the flywheel of a motor, which will enable the autoist to fix in his mind the timing of the valves, as it is referred to in the tabulations here given, and in the table the timing relations are given for several motors, so that the autoist will be enabled to select a timing which will accord with the speed of the particular motor he desires to doctor, taking into account the fact that a high-speed motor should be timed somewhat differently from a motor which runs at a low speed.

SATISFACTORY TIMING FOR GIVEN TYPES OF MOTORS

Name of Motor	Lead of ex- haust opening	Lag of in- let closing	Ignition advance	Lag of ex- haust opening	Lag of in- let closing	Speed at full power
Charron	44	0	var.	0	1	1,100
Gregoire	53	0	var.	0	5	1,200
Hitchkiss	44	33	var.	10	17	1,300
Motor	40	40	var.	0	0	1,400
Da racq	48	30	21	0	0	1,500
Renault	32	26	33.5	10	23.5	1,600
Sizaire	44	37	var.	0	15	1,700

The motors as here selected give a range of speed from 1,100 to 1,700 revolutions per minute, and the timing, which seems to give the best results in view of the respective speeds. In two of the cases the spark advance is fixed, and the range between the two is very great, considering the speed changes, which goes to show that a wide range is permissible.

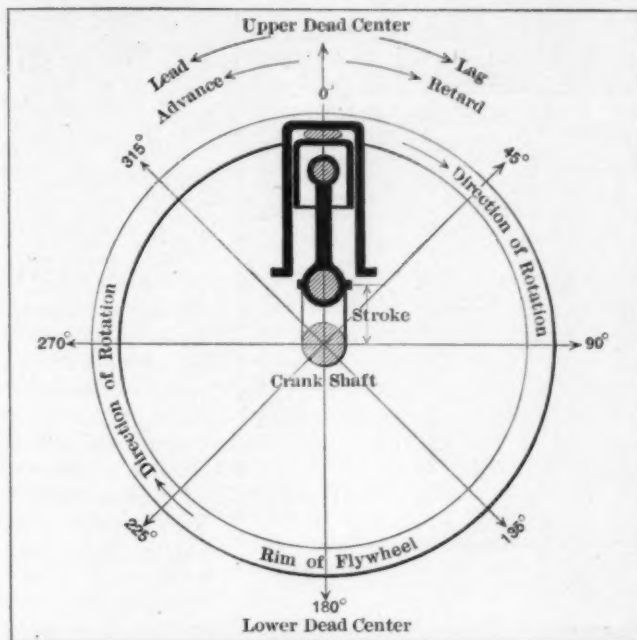


Fig. 2—Showing markings on motor flywheel, enabling autoist to gauge timing of the valves

Some of the Reasons for Frequent Valve Grinding

POPPET types of valves were adopted for gasoline motors because they afford the requisite qualities, under severe conditions of service, which will permit them to do the work required of them for long periods of time, with little or no attention on the part of the operator, but when they have to be overhauled no great skill is required in the process. The best results come if the valves are properly fashioned, and if the materials employed in their construction are those which will withstand wide variations of temperature and a considerable amount of shock. The material must also be close grained in order that the valve seat will grind to tightness.

Fig. 1 shows a type of cone-seat valve, which is used, perhaps, more than any other type, but in this case the head is attached to the stem with little or no fillet, and the result is that the head and the stem do not hold to their right angle relation after the valve heats up, because the small amount of metal at the junction of the stem with the head is insufficient to serve as a conducting medium for the heat which is picked up by the head but which must be conducted away by the stem. The measuring instruments which are placed alongside of the valves in this figure show a gap at the lower portion of the seat on one side, and at the upper portion at the other when the bases of the instruments are placed firmly against the stem. If the two

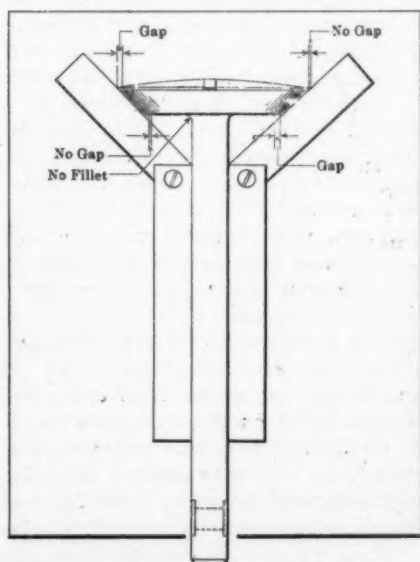


Fig. 1—Cone type of valve without a fillet between the head and the stem which warps when heated.

The aim of this article is to state why valve grinding is necessary, there being two reasons, one of which is due to improperly operating the car, and the other is the result of poor design of the motor. The illustrations are made comparative to help bring out the important points to be made.

protractors as placed show that the bevels are not at the same angle it is a self-evident fact that with the stem in its guide, if the head is not at right angles, as it will not be when it is as shown in Fig. 1, then the valves cannot be ground to tightness at all. This is frequently the case, and if a little Prussian blue is placed on the valve seat and it is smeared around evenly, it will then be found upon inserting the valve in its guide and giving it a twist that the blue will not remain evenly over the surface but will scrape off at one point of contact. It will not be necessary to use a protractor to locate this difficulty under working conditions, but it may be necessary to replace the type of the valve which has no fillet between the head and the stem, and substitute one of the design as shown in Fig. 2, which has a liberal fillet at the junction of the head with the stem, and which shows no gap when the two protractors are placed so as to show the angle of the bevel as it relates to the stem.

In some types of motors the valves are provided with flat seats as shown in Figs. 3 and 4. Warping will take place in precisely the same way as before stated, and referring to Fig. 3, it shows how the head will be off of the seat at one point in the diameter when it is on the seat at the other point, if the design does not include a fillet. Fig. 4 shows the flat-seated valve with a liberal fillet and it will be easy to

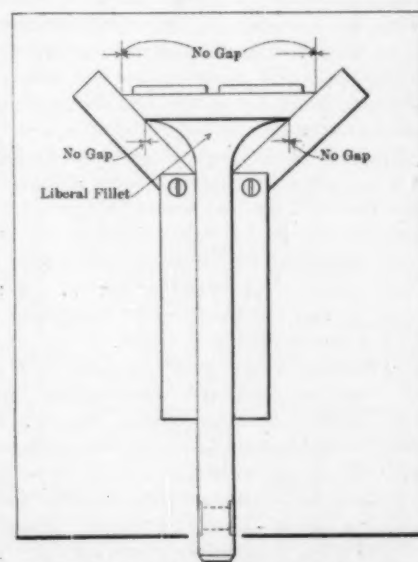


Fig. 2—Cone type of valve with a liberal fillet between head and stem which prevents warping with heat changes

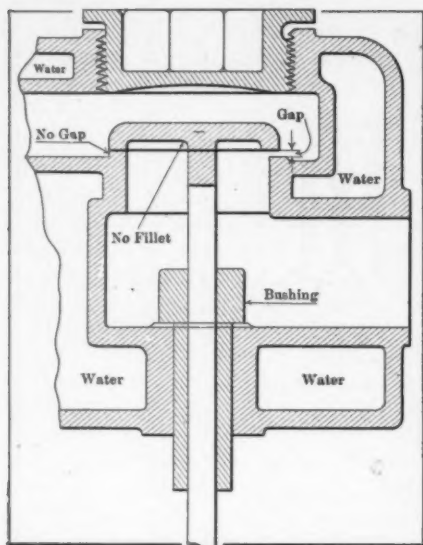


Fig. 3—Flat seat type of valve without a fillet, which warps when heated

consequence. Under such conditions, if the fillet is neglected, the chance of maintaining a tight relation of the valve to its seat will be reduced to a minimum.

If, in any given motor, the valves, after they are ground in, do not stay tight for a reasonable length of time it will be a fair assumption that the valves are not properly designed, or that the operator runs the motor on a retarded spark. There may be contributory reason in addition to either of these, but running on a retarded spark, if the valve is properly designed, induces excessive heating and prolongs the time when the red-hot gases are sweeping over the surfaces of the seats so that pitting results and this character of leaky-valve trouble will come independent of the design of the valve, excepting that some kinds of valve metal will stand more abuse than others.

In the selection of metal for valve heads 35 per cent. nickel-

understand how the large section of metal at the junction of the stem with the head will serve to conduct the heat from the head through the stem to the bushing or guide, from there through the section of the casting, and finally into the water of the water-jacket. If the stem does not fit quite closely in its guides the air gap resulting will retard the flow of heat from the stem to the water in the water-jacket, and the difference in temperature will be somewhat greater in

steel with a low carbon content serves extremely well, although it is claimed by some designers that this metal is not good to use in the stem, and they, when they use high nickel-steel heads, make the stem of mild steel and rivet one to the other. Another type of metal which was first brought out in Panhard cars and which works with good satisfaction, is a high carbon-steel product with the carbon ranging between 110 and 115 points with other components to match, excepting that the metalloids should be low, and it is probably an advantage to fabricate this steel in relatively small heats by the crucible process.

In addition to these types of valves, some very satisfactory performances are realized by using a cast gray iron head riveted to a mild steel stem. In this type of valve, the mild steel stem has good value from the bearing point of view, and it has been found in practice that cast gray iron not only serves well as the valve seat, but it is equally efficacious from the seat point of view when used as a valve head. Valves of this character are easily ground in, and they have the virtue of serving without pitting, a not uncommon difficulty in valves employing other materials. This pitting question is quite prominent in some of the types of nickel-steel.

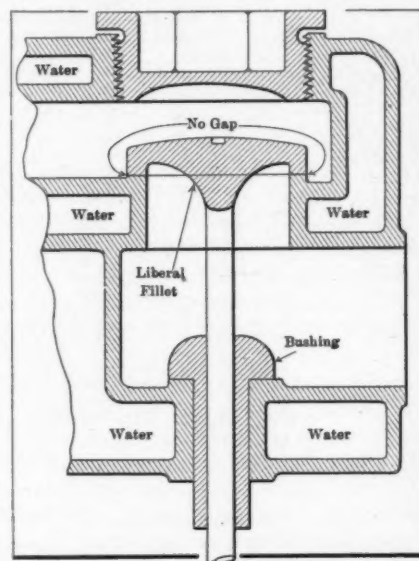


Fig. 4—Flat seat type of valve with a liberal fillet between the head and the stem, which prevents warping under heat changes.

Testing Steel—For Impact, Bending, Etc.

By BERTRAM BLOUNT, W. G. KIRKALDY AND CAPT. H. RIAL SANKEY.

(Second Installment)

AMONG the makers who supplied various types of steel for testing purposes, as mentioned in the last installment, were the Parkgate Iron & Steel Co., Messrs. David Colville & Sons, Messrs. Taylor Bros. & Co., Messrs. Walter Scott, Messrs. Thos. Firth & Sons, Messrs. Cammell, Laird & Co., the North Eastern Steel Co., Messrs. Dorman, Long & Co., and the Patent Shaft and Axletree Co.

Representative types of steel were chosen, and the following is a complete list, together with a short epitome of the respective British Standard specifications:—

1. Marine Boiler-Plate suitable for shell—British Standard Specification for Structural Steel for Marine Boilers (Report No. 14: Revised March, 1907: breaking stress 28 to 32 tons per square inch, elongation on 8-inch gauge length not less than 20 per cent.
2. Marine Boiler-Plate suitable for combustion chamber—British Standard Specification for Structural Steel for Marine Boilers (Report No. 14: Revised March, 1907): breaking stress 26 to 30 tons per square inch, elongation on 8-inch gauge length not less than 23 per cent.
3. Locomotive Boiler-Plate suitable for portions not exposed to flame—British Standard Specification for Steel for Plates, Angles, etc., and Rivets for Locomotive Boilers (No. 16 of Report No. 24): breaking stress 26 to 32 tons per square inch, elongation on 8-inch gauge length not less

In the present installment is given a list of the representative types of steel tested in accordance with the British standard specifications of each type, together with a short epitome of the respective specifications.

than 22 per cent. Not more than 0.05 per cent of sulphur or of phosphorus.

4. Locomotive Boiler-Plate suitable for portions exposed to flame—British Standard Specification for Steel for Plates, Angles, etc., and Rivets for Locomotive Boilers (No. 16 of Report No. 24): same as for item 3.
5. Forging—British Standard Specification for Steel Forgings for Locomotives (No. 8 of Report No. 24): Class B, breaking stress 25 to 32 tons per square inch, elongation on a test-piece 0.798 inch diameter and 3-inch gauge length not less than 27 per cent. with 25 tons per square inch breaking stress, and not less than 20 per cent. with 32 tons breaking stress. The sums of the breaking stress and of the elongation not to be less than 52.
6. Forging—British Standard Specification for Steel Forgings for Locomotives (No. 8 of Report No. 24): Class D, breaking stress 40 to 45 tons per square inch, elongation on a test-piece 0.798 inch diameter and 3-inch gauge length not less than 20 per cent. for 40 tons breaking stress, and not less than 15 per cent. for 45 tons breaking stress. The sums of the breaking stress and elongation not to be less than 60. Elastic limit not less than 50 per cent. of the breaking stress.
7. Locomotive Axle—British Standard Specification for Locomotive Straight Axles (No. 2 of Report No. 24): breaking

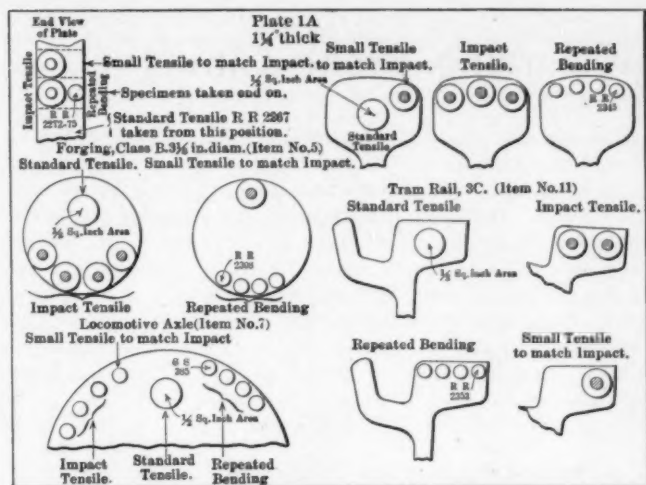


Fig. 1—Sketches showing position of test specimens

stress 35 to 40 tons per square inch, elongation on test-piece 0.798 inch diameter on 3-inch gauge length not less than 25 per cent. with 35 tons breaking stress, and 20 per cent. with 40 tons breaking stress; the sums of breaking stress and elongation not to be less than 60. Elastic limit not less than 50 per cent of the breaking stress. Not more than 0.035 per cent. sulphur or phosphorus.

8. Wagon Axle—British Standard Specification for Carriage and Wagon Axles (No. 3 of Report No. 24): breaking stress 35 to 40 tons per square inch; elongation on test-piece 0.798 inch diameter and 3-inch gauge length not less than 25 per cent. with 35 tons breaking stress and 20 per cent. with 40 tons; the sums of breaking stress and elongation not to be less than 60. Elastic limit not less than 50 per cent. of breaking stress. Not more than 0.035 per cent. sulphur or phosphorus.
9. Bull-Head Rail, 95 lb. section, as supplied to the North Eastern Railway. Basic Bessemer—British Standard Specifica-

tion and Sections of Bull-Head Railway Rails (Report No. 9; Revised July, 1909): breaking stress not less than 40 and not more than 48 tons per square inch. elongation on test-piece 0.798 inch diameter and 3-inch gauge length not less than 15 per cent.

	Per cent.
Carbon	0.35 to 0.50
Manganese	0.70 to 1.00
Silicon	not to exceed 0.10
Phosphorus	0.075
Sulphur	0.08

10. Bull-head Rail, 90 lb. section, as supplied to Indian Railways. Acid open hearth—British Standard Specification and Sections of Bull-Head Railway Rails (Report No. 9; Revised July, 1909): same as for item 9.
11. Tramway Rail, 95 lb. section—British Standard Specification for Tramway Rails and Fishplates (Report No. 2): breaking stress not less than 40 tons per square inch, elongation on test-piece 0.798 inch diameter and 2-inch gauge length not less than 12 per cent.

	Per cent.
Carbon	0.4 to 0.55
Manganese	0.70 to 1.00
Silicon	not to exceed 0.10
Phosphorus	0.08
Sulphur	0.08

12. Tire—British Standard Specification for Carriage and Wagon Tires (No. 5 of Report No. 24): Class C, breaking stress 50 to 55 tons per square inch, elongation on test-piece 0.564 inch diameter and 2-inch gauge length not less than 13 per cent. with 50 tons breaking stress, and not less than 11 per cent. with 55 tons. Not more than 0.035 per cent. sulphur or phosphorus.
13. High-tensile nickel-chrome steel for automobile parts.

The location of the various test-pieces was selected with a view of giving the best practical information in respect of the use of each type of steel, and in this matter the long experience of Messrs. Kirkaldy & Son was of the utmost value. Care was taken so as to record and identify each test-piece that its original position and orientation in the sample can be determined. Fig. 1 shows the positions from which sample test-pieces were taken.

Forced Lubrication—Trend in English Practice

By R. K. MORCOM
(Fourth Installment)

THE make-up in the experiment in forced lubrication mentioned in the last installment was by a small scoop pump feeding the proper quantity into the crankcase in the usual way. The oil after use was black in color, and smelt of petrol. Tested for viscosity it gave the curve X (Fig. 21) on a Redwood viscometer. Its flash point, open test, was 214 deg. Fahr. against 435 deg. Fahr. On distillation at 300 deg. Fahr. 1½ per cent. of petrol came over. After distillation the flash point was normal at 435 deg. Fahr. The oil was still dark in color, but appeared to be a satisfactory lubricant. On burning the amount of ash was very little over normal.

On the subject of oil the information of Table A is not very full. The general consensus of opinion is in favor of a high quality mineral oil of high flash point, well maintained viscosity, and low cold test. The viscosity curve of a satisfactory oil called "SSL" is given in Fig. 21. This oil has a flash point of 420 deg. Fahr., and is fluid at low temperatures. It is probably advisable to use a heavier oil in summer than winter.

There are many satisfactory oils on the market, but also unfortunately many bad ones. Most makers will give sound advice as to the oil which suits their make of engine.

It would have been interesting to collect some figures of temperature normal to different engines after a long run, and it might be found that an oil cooler would be advantageous. This is fitted to steam engines for hot climates, or long continuous

running, with beneficial results, and is invariably a part of a steam-turbine equipment.

The question of wear has not been considered, as the author has been unable, for obvious reasons, to collect reliable figures on this point. A car originally lubricated on the trough system has certainly run better, and shows less signs of wear, since forced lubrication was fitted; but one instance is not of much value. Many instances, however, of steam engines with forced lubrication could be given in which the wear has been infinitesimal.

An endeavor has been made to touch on the various points necessary to ensure good working of the system, and the conditions which exist. It is easy to meet these conditions, and when met it will be found that the forced lubrication system brings about high mechanical efficiency, quiet running and absence from wear.

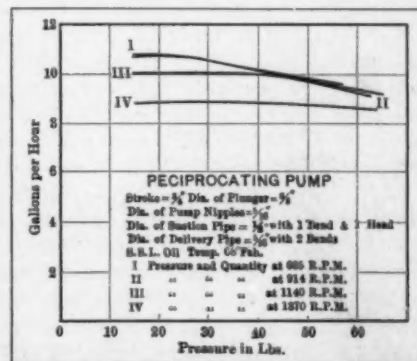


Fig. 17—Capacity of plunger reciprocating pump with oil at 68 deg. Fahr.

Peculiarities of Modern Non-Charring Brake-Linings

TRAINED in the belief that the brakes, to be efficacious, must be so designed that the shoes will press against the drum-face with considerable force in pounds per square inch, it is with much difficulty that men who work on this character of undertaking frequently make the mistake of designing so that the result of their handiwork falls below the possible realization. To be more specific, let it first be stated that the coefficient of friction, as it is usually stated for the several grades of materials, does not afford the true measure of the normal expectation under working conditions.

The coefficient of friction of the several materials, as it is usually determined, represents the multiplier which is obtained by dividing the whole force of friction by the normal pressure; hence, in brief language, the coefficient may be defined as the unit friction due to a normal pressure of one pound, and for the various materials, while it is not constant by any means, even for the same materials rubbing on each other, it may be approximately stated as follows:

APPROXIMATION OF THE COEFFICIENTS OF FRICTION	
Friction Materials	Coefficient
Cast iron on oak.....	0.49
Wrought iron on oak.....	0.62
Cast iron on cast iron.....	0.15
Wrought iron on wrought iron.....	0.14
Brass on iron.....	0.16
Brass on brass.....	0.20
Wrought iron on cast iron.....	0.19
Leather on wood.....	0.49
Leather on cast iron.....	0.28
Cast iron on cast iron, greased.....	0.10
Cork inserts on cast iron.....	0.35
Cork inserts on cast iron (lubricated).....	0.23
Asbestos friction fabric on cast iron.....	0.25

In the utilization of these coefficients, in the absence of experience, it would be the natural thing to accept materials that would afford the highest coefficient, as, for illustration, wrought iron on oak. Were the oak fireproof, the fact that the radiating surface is limited would make no difference at all, and the result would be extremely good. As it is, however, the oak begins to char at about 550 degrees centigrade, and, in automobile work, the radiating surface is so restricted that this temperature would be realized the first time the automobile so made were to be snubbed down a grade of any moment, and the brakes would soon be reduced to a point where they would cease to serve for the intended purpose.

Speed of Rubbing and Pressure per Unit of Area

In any event, when it is desired to get all there is in a given type of material, care must be exercised to so place the material, with regard to the speed of rubbing and the unit pressure, that the maximum result will be obtained. In this connection, metals follow one law and fiber-like fabrics obey quite another set of conditions. To substitute fabrics then, in place of metal to metal, is to court a different result, and the substitution may be the difference between success and failure.

Very little has been added to the store of real knowledge on this subject for many years; old theories have been verified to be sure, but what is now known has been known for a considerable period. Unfortunately, however, many designers pre-

(Continued on page 1194)

Questions That Arise—General in Scope

[133]—Would it not be possible to counteract the trouble of this sort by the simple expedient of firing gunpowder when the piston is well down on the stroke, and regulate the quantity of gunpowder so that the pressure will be maintained at the desired level?

There is scarcely any doubt of it.

[134]—Then why not use it; surely, self-starting is much in need?

Just so soon as self-stopping can be guaranteed, then self-starting, using gunpowder, will be an excellent idea; most individuals want to know that they are going to stop as well as to start. Gunpowder, gasoline, an electric ignition system, and a man of no brains, should make a combination that would demand the attention of law makers.

[135]—When a pipe in a combustion chamber of a motor fails to maintain tightness against compression, if grinding in cannot be resorted to, what is the surest way to overcome the trouble?

Cement, if it is made of litharge and glycerine to form a cement-like mass, if it is freshly applied (using pure glycerine), will serve the purpose. This cement is heat and acid-proof and possesses more than the ordinary virtue. It fails when the glycerine is diluted with water, as it frequently is, or if the litharge is adulterated, which is one of the regular occurrences.

[136]—When rims of wheels of the clincher or other types become rusty, what is the best way to eliminate the trouble?

Considering rust as a disease which is likely to spread, even if nearly all of the rust is removed before a new coat of japan is applied, it would seem as if the right principle is the one which would demand the use of iron rust in the mixture to be applied. Anti-rust coatings, then, if they are to be particularly efficacious, will abort the disease. Beeswax has this virtue; it combines with iron rust in such a way as to prevent the further

formation of the rust. If the beeswax is applied hot, or if the rim is heated before the beeswax is rubbed over the surface, it will serve as an anti-rust coating, nor will the beeswax attack the fabric or the rubber compound of which tires are made. In the application of the beeswax it is not necessary to remove absolutely all the rust from the rim. All that is necessary is to scrape the rim so that it will present a smooth surface for the tire to contact with.

How to overcome a leaky combustion chamber—Eliminating rust from wheels—Soap has various virtues besides its cleansing properties—Acids in mineral lubricating oil—The lever system as used in automobile work—To prevent tools from rusting—A good lacquer for bright work on automobiles—How to locate cylinder cracks.

[137]—Is there any virtue in soap as a lubricant?

Any slippery substance is a lubricant; it may also have the property of etching the surfaces of the bearings. In the discussion of a question of this sort, then, it is necessary to consider the two points, (a) lubricating, and (b) etching properties.

[138]—Is soap an etching ingredient?

If it has an acid reaction, yes.

[139]—Is it likely to have an acid reaction?

Yes.

[140]—Why?

Because it is composed of animal fats, saponified.

[141]—How is animal fat saponified?

A certain proportion of animal fat (vegetable oils may also be used) is diluted with water, and potash, or lye, is added, the whole is boiled to a certain consistency. The following are some proportions:

(A) Normal grade of soft soap.

Oil and tallow.....	45.0 parts
Potash	8.5 parts
Water	46.5 parts
Total.....	100.0 parts

[142]—What is soap?

It is a chemical compound; it is not oil, fat, potash, nor water. It is made from these.

[143]—What part does soap play in the etching process which is so undesirable for ball or roller bearings?

The fat may be acid in its reaction; it may produce acid by decomposition.

[144]—What is the composition of lubricants which utilize soap?

English railway axle grease:

	Summer.	Winter.
Tallow	504	420
Palm oil	280	280
Sperm oil	22	35
Caustic soda	122	126
Water	1,372	1,524

Proportions are all in pounds, and the quantity of caustic soda present, with water, is that which will saponify.

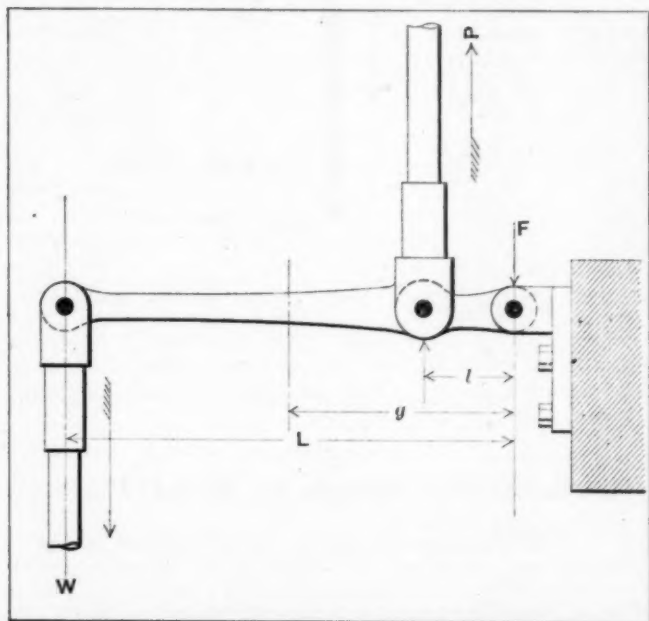


Diagram of lever system frequently used in automobile work

[145]—How is it possible to determine if soap is present in lubricating grease?

The soap is soluble in water.

[146]—How is it possible to tell if there is acid in the lubricant?

Litmus paper offers an excellent means for ascertaining an acid reaction in a solution. Tallow and most animal fats will decompose when exposed to light; if the grease, holding tallow or other acid-producing fats, is carelessly stored or much aged, it is likely to generate sufficient acid to etch the delicate surfaces of ball or roller-bearings.

[147]—Is there any chance of acid being present in mineral lubricating oil?

Yes; in the purifying process, acid may be used. One way to purify lubricating oil is to add a small percentage of oil of vitriol; agitate, and then wash the oil with water, agitating until it is freed of the oil of vitriol; it is well within the range of possibilities that some of the oil of vitriol will remain in the cleaned oil when it is siphoned off. After siphoning the oil must be stood over quicklime. An acid test is necessary in order to determine whether or not all the acid has been washed out; if a trace remains, it is scarcely feasible to employ the oil in the process of lubricating ball or roller-bearings.

Computation Method for a System of Levers

[148]—The lever system as here illustrated, being frequently used in automobile work, is generally computed on a basis of no friction; what is the necessary change in the formula if it is desired to include some estimate of the friction elements?

Let

W = the weight or pressure applied in the direction of the arrow at the end of the lever,

L = distance in inches from the fulcrum F to the end of the lever at W ,

w = weight of lever in pounds if it lifts vertically, or the equivalent in friction, if it slides horizontally,

g = distance between center of gravity of the lever and the fulcrum in inches.

l = distance in inches between fulcrum and center of pullrod P ,

V = weight of pullrod P if it is suspended vertically, or the equivalent friction, if it slides horizontally.

P = pull in pounds exerted on the pullrod P ,

When

$$W = \left\{ P - \left[V + \frac{(w \times g)}{l} \right] \right\} \times \frac{1}{L}$$

or,

$$L = \left\{ P - \left[V + \frac{(w \times g)}{l} \right] \right\} \times \frac{1}{W}$$

The center of gravity of the lever may be found by balancing it on a V-track; it may also be determined by calculation.

[149]—How can tools be prevented from rusting?

Melt 1 pound of fresh leaf lard; add 1-2 oz. of camphor; remove the scum that forms, and add graphite to give the desired color and consistency. When the anti-rust paint thus made is cool, apply it to the surfaces of the tools; after cleaning them thoroughly, and when the coat has stood for a period of 24 hours, use a soft linen cloth to polish. This treatment will save the tools for months under the most severe conditions of salt-sea air, and they will always have a presentable appearance.

[150]—To soften the glare of headlights, is there not some way of coating the glass front?

Prepare the glass by first washing it in hot water with plenty of soap; dry thoroughly; dip in a bath made by adding the white of eggs, two to the pint, and filter the egg solution before dipping. When the glass fronts are well coated with the egg solution, lay them by to drain and dry. With the glass ready for the dimming process, it remains to select yellow aniline dye, and after dissolving a small part of it in collodion, it will be ready to apply to the prepared surfaces of the glass. A thin coat is best; apply repeated coats to get the desired dimming effect. The glass will take on a frosted effect; the glare will be softened, and the coat will be waterproof and serve for a long time. The coat may be removed with alcohol.

[151]—What is a good lacquer for bright work, as lamps, rails, etc., on automobiles.

The lacquer prepared as here given will serve very well indeed, but it is necessary to prepare the surfaces to be lacquered if the results are to be satisfactory. For the surfaces, what is wanted is a high polish and absolute freedom from grease. The lacquer may be prepared thus:

Bleached shellac	60 grams
Manila copal, freshly powdered.....	60 grams
Gum mastic	60 grams
Absolute (grain) alcohol.....	1 kilogram
Coarsely powdered glass.....	small quantity
Allowed to stand for (frequently shaking)	14 days
Boracic acid	1 gram

Filter and use, the best plan being to apply repeated thin coats with a camel's hair brush.

Any desired color may be given to the lacquer by adding aniline dyes. A very little of the dye of the color selected will serve for the purpose. Red and blue will form clear solutions; green must be handled cautiously; it may have to be filtered; yellow is a good dye to handle. In applying lacquers it is desirable to go about it in the same way as shellac is applied—thin coats, deftly applied by means of a suitable brush, with very little rubbing; it will become tacky if it is fussed with very long.



Cylinder Casting Proves to Be Unsound

Editor THE AUTOMOBILE:

[2,310]—I have had my motor but a short time, and the other day when it failed to work, I had it taken down, dissembled, and the cylinders examined, and found that one of them was cracked, but on further examination, it was also discovered that a part of the bottom flange was fractured, and a close examination of the fracture showed a defect in the section of the metal which leads me to suspect that it was not a very good casting. What are the expectations with cylinder casings?
Minneapolis, Minn.

SUBSCRIBER.

Fig. 2 shows how cylinder castings may be defective, due to design, and almost independent of the quality of the metal used. A is a round section of considerable diameter, and shows a soft core. B shows a hole in the core of the same section, which is about the size necessary to cut away the defective metal. C is a square section, showing how the defective metal bunches at the center and trails away toward the four corners. D shows a rectangular section, and how the metal verges into the defective after a fashion somewhat as shown in C. E presents an angular section, and shows the probable zones of defect. F presents a section without any sharp turns, but with even thicknesses of walls, but no defects. G presents another design which is generally defective, and H shows how defects may be eliminated. In cylinder designing, if large fillets are used where walls verge into each other, defects will abound, or if the flanging at the bottom is very thick, it is likely to be spongy. If the material is not good, or if the foundry work is indifferent, defects may be due to these causes.

Metallic Hose Used for Water Connections

Editor THE AUTOMOBILE:

[2,311]—I have a water system on my car which is bad because there are considerable lengths of rubber hose, and they leak even though they do not rot out. Most of the leaks are at the joints. Is there any way out of this trouble, besides putting in a proper coppersmith's job?
Wichita, Kan.

J. A. W.

Fig. 3 shows flexible metallic hose connections on a motor and experience with this material has been very good, not only with the water, but with the exhaust and intake connections as well. The flexible metallic hose can be ordered with makeup connections, and if the measurements are properly taken, the autoist can attach the hose in place with very little trouble to himself. This method is more expensive than garden hose. There are various forms of flexible metallic hose, and one of the most acceptable types is made of copper tubing which is put through a mill and reduced to spiral corrugation form.

Best Way to Cool Valve Stems of a Motor

Editor THE AUTOMOBILE:

[2,312]—I am working on a new design of a motor with a v'ew to turning out a commercial car which will class favorably with the best products along other lines, excepting that I propose to make everything as nearly automatic as possible, and get as far away from the trouble that the driver will have to attend to as I can. In my experience, I have found that valves are a source of quite some trouble, and I think they ought to be properly cooled, and that the valve should be in a separate housing, so that the seat can be examined outside of the motor, but I do not like the overhead type of valve construction, and want to know how to accomplish the same purpose without putting the valves in the head. READER.
Dubuque, Iowa.

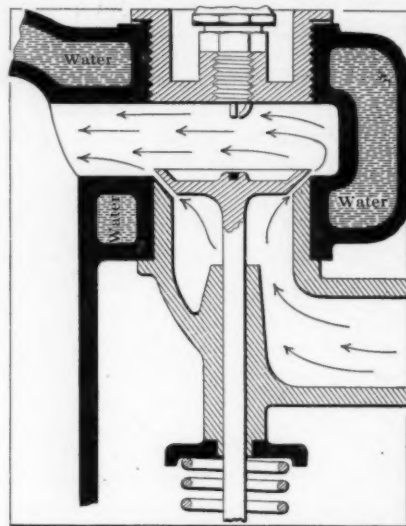


Fig. 1—Design of valve having the advantages of the valve in the head without the location which is objected to

Referring to Fig. 4 it will be observed that the valve and its housing are independent of the cylinder casting, but are inserted in the T-type of cylinder from the underside, but the water-cooling is quite as efficacious as would be true were the seat and its casting integral with the cylinder. The water-jacket extends all around, so that it cools the seat perfectly.

Thermo-Syphon System of Water Cooling

Editor THE AUTOMOBILE:

[2,313]—If a large water pump is necessary in some types of automobiles for circulating the cooling water, how is it possible to get good results without a pump? I understand that quite a number of automobiles are run on the thermo-syphon system, and that there is no pump employed in this case.
Richmond, Va.

M. C. K.

The illustration, Fig. 4, shows a thermo-syphon system in which no pump is employed, and the water circulates in the direction as shown by the arrows. While it is common talk to the effect that this system works by natural circulation, the fact remains that steam is generated at the hottest zone over the combustion chamber, and this steam, coming off of the surface in a slug, rushes away through the course of least resistance, and acts very much as the plunger of the pump. It has the potential force of the energy stored in it, and is perfectly capable of doing mechanical work in substantially the same way that the plunger of a pump drives water before it, or creates a depression into which water runs. In addition to the mechanical effect of the slugs of steam driven off during each power stroke, there is the natural difference in temperature between the water over the hot zones and that in the rest of the cooling system, and to some extent this difference is responsible for the circulation; this alone, however, would act sluggishly.



Fig. 2—Sections of cast gray iron showing how defects will be found at the cores of the thickest sections in each example

One or Two Small Details About Motors

Editor THE AUTOMOBILE:

[2,314]—Kindly answer the following questions through the columns of your paper:

1. What is the formula used in ascertaining the proper spring tension of an automatic inlet valve of a 4-cycle motor?

2. Would it be advisable to change the timing valve, when auxiliary exhaust ports are used on a 4-cycle motor?

3. What is the timing of a Franklin motor?

4. What is the best brake lining to use against a bronze shoe?

S. E. N.

Cedarhurst, N. J.

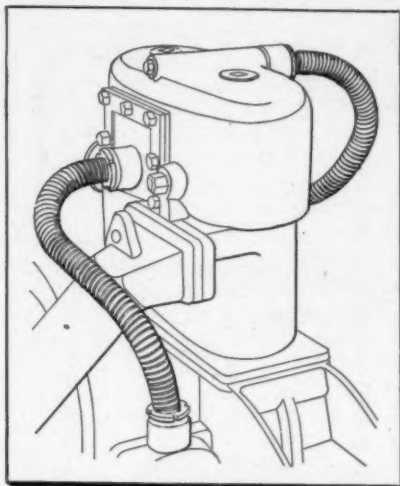


Fig. 3—Flexible metallic hose may be used in place of garden hose to good advantage—it costs more.

the spring should be strong enough to sustain against this depression.

2. Not if the timing is proper, independent of the auxiliary valve.

3. Direct an inquiry to the Franklin Company.

4. You have your choice between cork inserts and asbestos fabrics, either of which work independent of all possible temperature changes.

The Larger Tire Will Sustain More

Editor THE AUTOMOBILE:

[2,315]—Permit me to ask you through your inquiry column the following question:

Why is a 4-inch tire on a 34-inch wheel base more desirable (if it is) than a 3 1-2 inch, leaving out the question of easier riding and less wear to machinery? On a 2500-pound car, 112-inch wheel-base, which size tire will cost the user less in the long run, and why?

Booneville, Miss.

L. D. RINEHART.

The life of a tire, other things being equal, is proportional to the square of the section diameter. The square of 4 is 16 and the square of 3.5 is 12.25. The life of the 4-inch tire from this point of view will be as 16 is to 12.25 comparing it with a 3 1-2-inch tire.

The second question cannot be answered with the data afforded. To begin with, the best result will come from tires if they are properly inflated; in the second place, they will die of old age any way, and they will do useful work during their period of life if the opportunity is afforded. The service you can get out of a tire then, depends upon whether or not it is used continuously. Likewise, a dozen other considerations come into the accounting, but the smallest size tire that should be used on any automobile is that which will stay almost round when it is inflated up to the normal pressure, notwithstanding the weight which is put upon it. If the tire is not big enough it cannot be inflated to roundness at all.



Having Trouble Timing the Magneto

Editor THE AUTOMOBILE:

[2,316]—I am a subscriber to your valuable paper. Will you kindly answer the following questions through your columns:

I have a 4-cylinder car equipped with a Remy Magneto, and after starting the car, and then stopping it, by means of throwing the switch off, the engine will reverse and turn over several times, and there is knocking when this happens. Can you advise me what the trouble is?

Also can you advise me why my radiator should get to the boiling point and the water steam out of it, after driving 15 to 20 miles on high speed? I keep my spark advanced as much as I can, and use as little gasoline as possible.

L. F. P.

Pittsburg, Pa.

The following is a communication from the Remy Electric Company in relation to this case:

Your communication of May 26th, outlining questions from some of your subscribers is received. In the first question, we would say in answer thereto, that the chances are that the magneto is not properly timed with the motor. We do not see how, if the switch is cut out, the engine can continue to run, even though backward. The cylinders must be dirty and full of carbon, which causes continued ignition. We would suggest that your subscriber first assures himself that the cylinders are clean, and that ignition is not caused by something other than the ignition apparatus. Next, be sure that the instrument is timed properly. The contact spring should leave the contact screw just as the piston passes over top center of the working stroke. An adjustment here of perhaps 10 degrees can be made by moving the contact screw in and out. The little line on the brass distributor should be exactly opposite one of the pegs, and the contact screw should leave the contact spring at the same time.

The fact that the engine pounds would indicate too early timing, which in itself would cause the engine to reverse, but we do not see how the engine can continue to run when the switch has been shut off, unless from some other cause than the ignition apparatus.

Your radiator, if it is large enough for its intended purpose gets hot and steams because you run the motor on a retarded spark, or as the Remy Company states, the magneto is not properly timed.

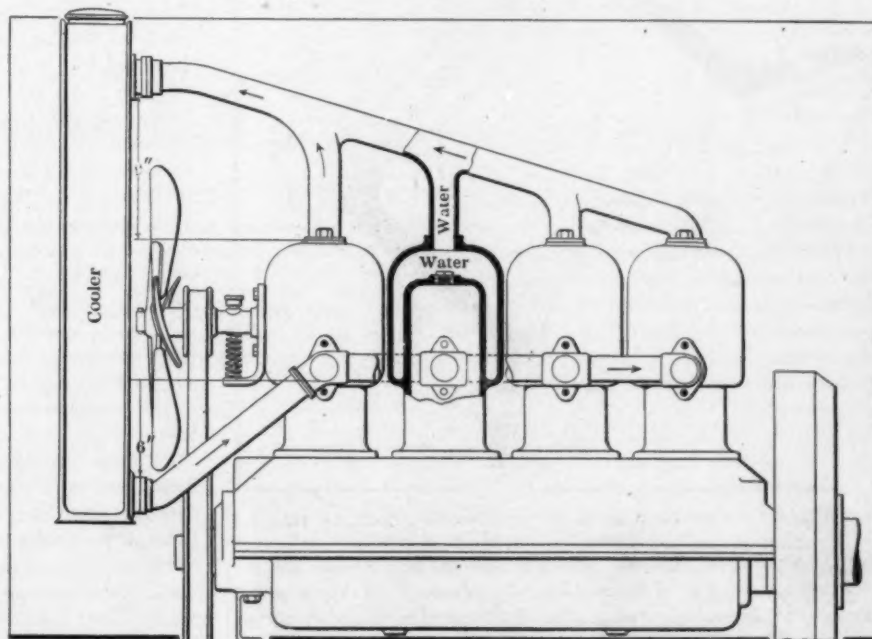


Fig. 4—Thermo-siphon system of cooling in which the steam generated acts as piston

Studies Involving Refinements of Gasoline Equipment

WHEN a \$5,000 automobile is prevented from running, due to the presence of a disorder which could be cured by five cents' worth of labor at the proper time, the man who pays for the automobile is afforded an opportunity to do a little hard thinking, but the maker who neglects to indulge in the cost of the additional labor required will find himself in a position where his many friends will generously disagree with him.

It is scarcely to be supposed that an automobile with a plugged-up gasoline pipe, if it reaches the purchaser in that condition, was ever tested by the maker to find out whether it was any good or not. In a case of this sort, the purchaser is bound to reach the conclusion that the maker is not very much interested in the quality of the automobile. Strange as it may seem, the maker of this generic type is frightfully particular that the quality of the money he exacts must deliver a musical ring. Is it not a reasonable demand of the purchaser that the maker be a little particular about the finishing and tuning up of the automobile? True, it runs into dollars to find all the little faults and correct them.

Referring to the type of gasoline tanks which are held under pressure, Fig. 1 presents a relatively large diameter filler, with a leather packing ring which is spread over a considerable area, and which is held in place by the large diameter of the washer, and the fact that it inserts as shown at I1 and I2. The filler cap has a coarse thread, and a lead at the point marked L1, so that when it is placed in the position to be screwed on it will sleeve over for the distance of at least one thread, thus providing a position finder and avoiding the difficulty which is usually experienced in the act of threading on a cap.

This filler cap is of such large diameter that it will almost screw down to pressure tightness without having to use a

Points out that the filler cap for the gasoline tank should be made so that it will hold pressure. That gasoline will not flow through a fine wire mesh if it is wetted by water first. A water basin is shown to have advantages. Means for clearing the gasoline piping of scum and other obstructions, shown

screw up the cap until it becomes tight. The leather packing does not have to be of any very special grade of material; calfskin is all right, cowhide will do; a thickness of 1-8 of an inch will give it the desired stability.

The filler cap screws down over the filler casting for a considerable distance, and the casting should be long enough to bring the filler orifice out in the clear, so that a funnel may be inserted in the orifice

without having the diameter of the tunnel scrape against the body finish. There is no reason why the filler casting should not neck out for any distance. In some types of automobiles this casting is even 24 inches long. Where the casting flanges to the copper of the tank, it should have a considerable bearing, and it should also be peened to the shape which will conform with the curvature of the shell of the tank. A reinforcement piece might well be placed around the orifice of the shell of the tank, so that the riveting for the filler casting will be more secure, but riveting alone should not be relied upon to make a tight joint. All the surfaces should be tinned over before the parts are assembled, and the joints should be sweated in order to complete the undertaking on a basis which will insure tightness under pressure.

Filters Are No Protection Against Water

The majority of men who run automobiles are imbued with the idea that a chamois-skin filter will prevent water from entering

the gasoline tank, but they think they know that it will let gasoline go by. The open door from the chamois-skin point of view depends upon whether the chamois skin is first wetted with water or gasoline. If water is first applied, then water will go through, but if gasoline is first applied, then gasoline will go through. To further indicate the cantankerousness of a piece of chamois skin, it is only necessary to say that if

it is wetted on one part by water, and over the balance of the surface by gasoline, a stream of water will flow through the part which is wetted by water, and a stream of gasoline will flow through the part which is wetted by gasoline.

What is true of chamois skin is equally true of a fine mesh sieve; contrary to the usual expectation, a sieve wetted with gasoline is just as good a protection against the flow of water as the protection afforded by a chamois skin. The very fact that a sieve first wetted with gasoline bars the flow of water, constitutes the reason why a sieve used in the bottom of the float bowl of a carburetor will prevent water from flowing out through the drain cock, even though it will let gasoline flow through up to the limit of its mesh capacity. The types of carburetors which are so made that sieves are placed to prevent the water from flowing out soon become water-logged, and the poor autoist who does not know enough to throw the sieve away is benumbed with the extent of the trouble which comes from the accumulating water, and if he goes to a repair shop which has a

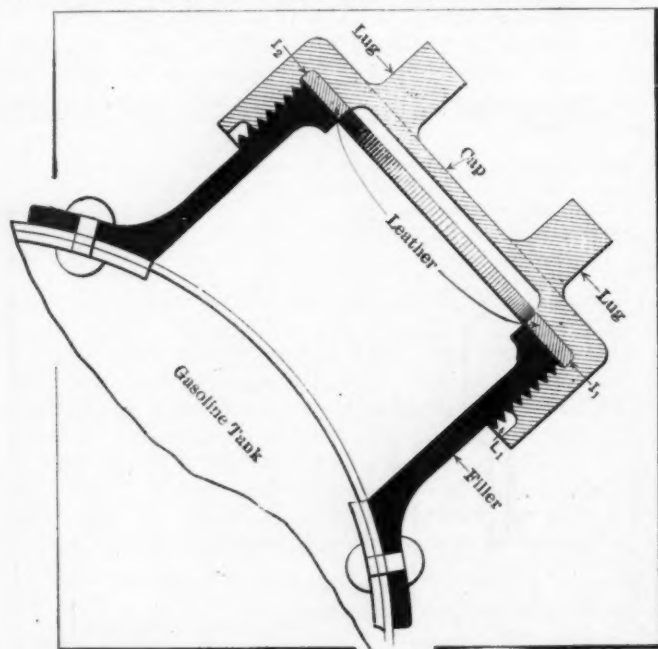


Fig. 1—Large-diameter filler, with leather packing ring

spanner wrench or any other device. Should the leather become defective or crusty, thus making it necessary to apply extra pressure in order to realize gas tightness, the lugs as shown project upward for a distance of 5-8 of an inch, so that a tire tool or any other handy length of material may be utilized to

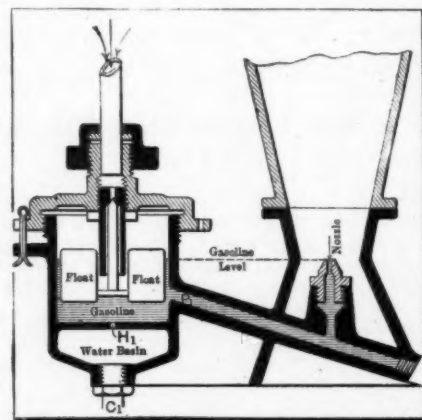


Fig. 2—Section of float bowl, with separate water basin.

director who believes in the efficiency of a sieve, as a means for separating the water from the gasoline, he will come away without learning anything about his real trouble, and he may labor under the further disadvantage of believing that the trouble is elsewhere, which will prevent him from pursuing the right course for the purpose of eliminating the real trouble. Fig. 2 shows a section of a float bowl in a carburetor with a separate water basin at the bottom, and a hole, H1, in the separating wall which should be big enough to let a drop of water through. The gasoline passageway, P1, from the float bowl to the nozzle should have its orifice at the float bowl far enough above the bottom of the float chamber to prevent the drops of water from floating into the passageway impelled by the current of gasoline, which is set up by displacement in proportion as gasoline is sucked out of the nozzle. The drops of water which find their way into

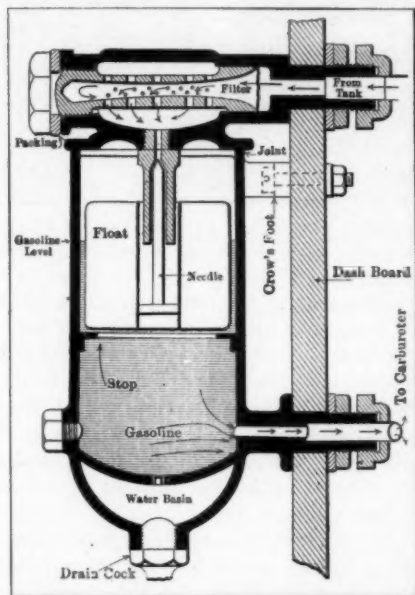


Fig. 3—Auxiliary dashboard tank, with filter

The needle valve is forced up against its seat by this manifestation of buoyancy when the bowl is filled up to the level which is on a hydraulic grade with the top of the nozzle in the depression chamber. The float may be made of copper, which should be light in weight, and relatively small, but if it is not properly made it may spring a leak, in which event gasoline will run into the float, and its buoyancy will be destroyed.

Under such circumstances the float will not lift as the gasoline runs in and the carburetor will flood because the needle will not be pressed against its seat at the proper time, and the level of the gasoline in the float bowl will then be above the top of the nozzle in the depression chamber.

In order to repair this difficulty it will be necessary to remove the float from the chamber, enlarge the puncture so that it will be big enough to let the gasoline out, apply a little heat

to drive off the vapor, and then solder up the hole, but in the act of soldering care must be exercised to permit air to enter to fill the space; otherwise a vacuum will obtain within the float, in which event the thin walls will fall in because the pressure on the exterior surface, which is 14.7 pounds per square inch, will exceed the pressure on the interior surface by the difference between the pressure of the atmosphere and the pressure of the vacuum within.

In some cases, floats lose a part of their buoyancy, as when the material is porous, and the result is that they sink to a lower level, so that the gasoline in the nozzle falls below the surface, and the mixture resulting is in a "starved" state. There are two ways of overcoming a difficulty such as this, one of which is to substitute a good float for the loggy one, and the other way lies in having a means of adjustment which will either permit of raising the height of the needle stem with respect to the float, or lowering the position of the seat for the needle with respect to the same, as shown in Fig. 2. There are divers mechanical ways of accomplishing this function, but it must be said that the cure is oftentimes worse than the disease, due to the fact that the adjustments when made by the means provided, will not stay made. Before administering his medicine it will pay the "doctor" to first thoroughly diagnose the case.

(Continued on page 1196.)

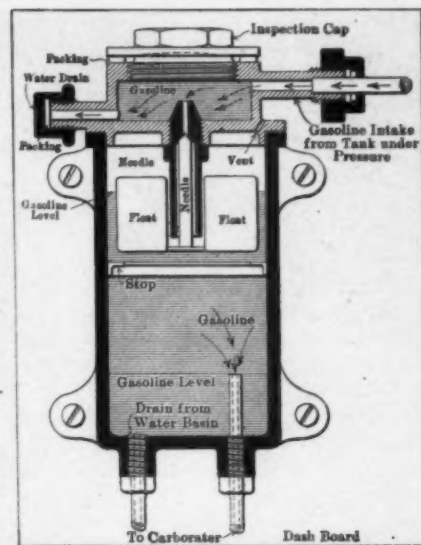


Fig. 4—A promising form of filterless dashboard tank

Some Ill-Advised Methods to Employ in Driving

TURNING around in a relatively narrow street, if the wheel base of the automobile is long, is likely to result in the situation which is shown in Fig. 1, another view of which is given in Fig. 2. The tire of the outer front wheel is brought into abrupt contact with the edge of the curb, and even if the fibre does withstand the shock for a time, it is more likely than not to be so weakened that the life of the tire will be much shortened. It is quite impossible to expect that the average automobile is capable of being turned around in a narrow street. Attempts have been made to render this possible; taxicabs, for illustration, are so designed that in view of a relatively short wheel base they may be turned around in a circle of approximately 35 feet in diameter. This means that the wheel base must be substantially 100 inches, and the locked position of the canted wheels must be about 36 degrees.

Obviously, to realize the ability to turn the car around in a

Showing how the careless driver can materially decrease the life of his tires by attempting short turns with a long-wheel-base car. Inexpert work with the slide lever is very wearing on the gears, as is clumsy cranking on the anatomy of the operator.

narrow street, it is necessary to sacrifice some other important qualities, as a long wheel base; but the owner of a long-wheel-base automobile, who elects to take advantage of the qualities residing therein, offers wide opportunity for a high cost of tire maintenance if he fails to operate the long-wheel-base car in accordance with its characteristics. In a word, a long-wheel-base automobile in the hands of a short-

wheel-base driver evolves the situations as presented in Figs. 1 and 2.

The relative advantages of the various types of transmission gears, as selective, progressive, three-speed, four-speed, etc., are common subjects for discussion, but nearly all the edifying talks on the subject fail to take into account the results which come from lack of deftness, or if the driver is timid. Fig. 3 shows how the clumsy learner fumbles the slide lever in the process of shifting gears; he fails to take into account the fact that the



Fig. 1—Outer wheel of the automobile strikes the curb in the process of turning the car around, injuring the fabric beyond repair

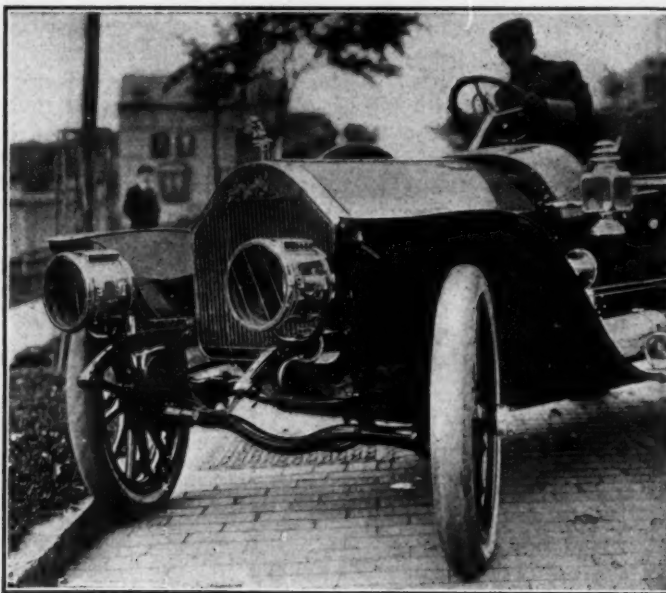


Fig. 2—Another view of the same automobile taken to show how the sharp edge of the curb eats its way into the tread of the tire

two relating members must be traveling at substantially the same speed before there is any use in trying to engage them; he might just as well understand that if two gears are to be meshed with each other, they must travel at precisely the same speed before the operation can be performed. There is really very little to learn about sliding gears, excepting to remember that the speeds must be identical, and then to be able to realize when this condition is present, and to understand that promptness is the one remaining virtue. When the meshing gears are operating at substantially the same speed, a deft movement of the lever will permit of engagement without even a click, but the clumsy clashing of gears results in the chipping of the teeth, and a character of depreciation which cannot be repaired.

The learner who is afraid of a back kick is the one who is most likely to get it; his very timidity results in his forgetting that he failed to retard the spark before cranking the motor. It is understood, of course, that the spark should be retarded so that ignition will take place after the piston comes up on the compression stroke, dwells at the end of the stroke for a time, and then recedes in the act of making the power stroke. If the spark is retarded five degrees, the piston will be across the

dwell point, and will be sufficiently on its return stroke, so that if the mixture is ignited the force will be effective, and positively in the desired direction. If the autoist disregards the retarding of the spark, and then laboriously pulls the crank, using both hands, as shown in Fig. 4, he is making every point in favor of a resounding back kick, which should, according to the law of probability, make him eligible for a trip to a near-by hospital, and he will get off easy if he has nothing worse to complain of than a broken arm.

The danger attending a back kick is much accentuated in the types of motors which have a high compression. The rate of flame travel increases with compression, and unless enough energy is stored in the flywheel in the act of cranking to overcome expansive forces which retard the piston in its upward travel, this character of difficulty is especially likely to creep in as the product of high compression, and a lazy method of cranking. The right way to crank a motor is to positively retard the spark, and to crank smartly, so that enough energy will be stored in the flywheel during the earlier proportion of the compression stroke that the final effort will be with relative ease, due to the fact that the energy stored in the flywheel will be given up.



Fig. 3—A fumbling learner who does not know that gears to be meshed must be brought to the same speed and shifting deftly done

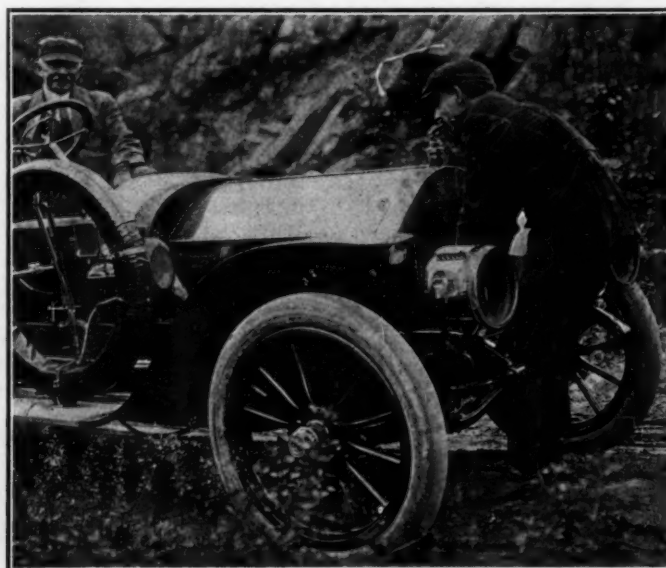


Fig. 4—Hugging the starting crank, waiting for a back kick, with the prospects of not having to wait very long

High Potential Test on Porcelain Spark Plugs

IGNITION work is now regarded as of such great importance that autoists are justified in giving its details the most searching scrutiny. It is self-evident that the motor will be valueless if the ignition system fails to work, and it stands to reason that the part which is subjected to the highest strain should be of the greatest strength. It has taken a long time even for designers to reach the conclusion that the dielectric strain in the porcelain insulation of the spark plug is in many respects even more severe than the result due to combined torsion and bending in the crankshaft of the motor. A blow is struck when a high potential wave is impressed on the porcelain of the spark plug insulation, just as effectively as would be true of such a blow were it the direct result of contact with a falling weight or were it hit with a hammer.

When a magneto is used as the source of electrical energy, it is so contrived that it builds up its voltage, increasing until the resistance of the spark gap in the spark plug is broken down, and if this is true, the higher the resistance of the spark gap, the higher will be the voltage of the magneto. High resistance in the spark gap is brought about by increasing the length of the same, but if the porcelain fails in point of dielectric strength the length of the spark gap may be regarded as in excess of that allowable.

Considering these circumstances, it is safe to reach the conclusion that the ability of the magneto, all other things considered, is absolutely limited by the performance of the spark plug. This is not to say that the magneto is to be condemned if a spark plug proves to be unruly, but it does indicate that there can be no higher voltage delivered by the magneto than that which will break down the gap in the spark plug, or if the porcelain is weaker than that indicated by the voltage which pierces the gap, then the porcelain holds in its make-up the limiting factor.

A considerable number of tests, which were made for the purpose of determining the performance of porcelain as used in spark plugs in ignition work, would seem to indicate that the dielectric strength of porcelain is sufficiently high for every practical purpose. The tests invariably show that when the porcelain fails to sustain, the trouble is due to arcing over rather than to the breaking down of the section of the same. This arcing over difficulty depends upon the character of the surface, its condition, and the distance between the electrodes.

Method of Conducting the Spark Plug Tests

In every case, the high potential tests on the spark plugs were made by applying an alternating voltage between the terminal stem and the shell; first with insulating material between the terminal of the spark gap proper, and second, without the insulating material in the spark gap. The first test is made to determine the breakdown voltage of the porcelain insulator. The second test shows the breakdown voltage of the spark gap.

The voltages are applied at a low value, raised gradually, and the effect noted. The approximate time which elapses between the first application of the voltage and the instant of arcing is generally about ten seconds.

The transformers used have a capacity (maximum) of three kilovolt-amperes, with a normal ratio of 6,000 to 100, which by means of suitable mechanisms may be changed to 4,000 to 100, in which event the output is normal at 3,000 kilovolt-amperes. The voltage is measured across the low tension circuit in connection with the ratio of transformation. The source of current is a sixty-cycle circuit, the voltage wave-form is practically a sine curve, and the voltages given in the statement of tests are what is known as "effective"; in other words, they

Tests were made in order to ascertain the dielectric strength of the porcelain used under the conditions fixed in spark plug. The conditions were: (a) with spark gap insulated; (b) without insulation between spark gap terminals.

are square root of mean square values.

Some Practical Results Obtained

T'st V'l't'ge No. Applied	Remarks
XX 17,400	Arced over upper and lower surfaces
X 5,220	Arced from terminals to shell
AX 2,700	Arced from terminal to shell

The above tests were taken at random from spark plugs of different de-

signs, and they show the wide variation which is due, not so much to the character of the material used in the porcelain, or the method of its manufacture, as to the distance between the electrodes as it influences arcing over the surface.

None of the preceding tests show the voltage which is possible across the spark gap, when the porcelain is so placed in its housing that arcing across its surface between terminals is aborted. When the porcelain is properly protected so that it is in a position to do the work for which it is intended, then the air gap voltage ranges all the way from 16,000, which proved to be the puncture point for the particular porcelain which was tested, down to 1,640 volts, which was limited by the poor way in which the insulation was used, so that instead of building up a higher voltage, arcing across from metal to metal over the surface of the porcelain took place.

In every test made so far at the Electrical Testing Laboratories at Eightieth street and East End avenue, New York City, according to a statement which was made to the Editor of THE AUTOMOBILE, care was exercised to have the porcelain surfaces perfectly clean and dry, and to note the relative humidity during test, room temperature prevailing, and such other data as would be likely to have bearing upon the subject. It seems, from the experience thus far afforded, that the average spark plug fails, not because the porcelain is inferior, but for the reason that it is not advantageously placed in the metal portions of the spark plug.

It is a source of some regret that the investigations thus far conducted do not include tests which will show the effect of service on the porcelain as used in spark plugs. There are no test data available for spark plugs which are discolored in service, and the question naturally arises as to the effect of discoloration, also of temperature and time. As one of the great questions which will have to be disposed of before the automobile may be regarded as well on the road to standardization, this spark plug situation will have to be investigated, and when a sufficient volume of data is available, it will be a nice undertaking for some board of competent jurisdiction to sort out the things that are for, and the factors that are against, the best obtainable result, and reduce the desirable portions to an intelligible standard.

If it is possible to realize 16,000 volts in the air gap without piercing the insulation in some one case, then it is accepting less than the obtainable result to put up with anything below this figure. If a spark of great energy is necessary under the conditions which obtain with automobile motors, it follows that in addition to a magneto which is capable of furnishing the electrical energy, a system of spark plugs must be employed which will stand up under the work and excite the magneto up to its maximum safe limit.

High Tension Cable Insulation Tests

It has been found that the heat which abounds around motors is high enough to affect the insulation resistance of the high tension cable unless it is so made as to take this issue into account. Good cable, as selected for ignition work, tests up to about 27,000 volts before breakdown—high enough to serve very well, especially if the spark plug becomes the limiting factor.

Columbus Automobile Club: A Success



Music Room with Oriental Decorations



Well Appointed Lounging Room

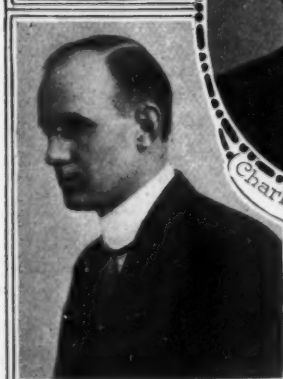


View of Secretary's Office

Chas C Jaynes 2nd V. Pres



Perin B. Monypeny



Herbert A. Mason Treas.

Charles E. Firestone
President

Norman O. Aeby 1st V. Pres.

COLUMBUS, O., June 27.—Although the Columbus Automobile Club is not yet three years old it has achieved a notable reputation for push, efficiency and civic pride. It exerts a great influence in motor circles in the Middle West and to its efforts is due, in appreciable measure, the good feeling toward automobile owners which is shown in Columbus and vicinity by the general public.

The club was organized early in 1908 by a small band of enthusiasts who saw the need for a closer organization of motorists in this section. The club began to grow from the moment of its birth until to-day it holds an enviable position among Ohio automobile clubs.

The first officers of the club were: Max Morehouse, president; Perin B. Monypeny, first vice-president; Dennis Kelly, second vice-president; Herman Hoster, secretary, and E. M. Schoenborn, treasurer. The first form of organization was that of the usual association where the officers generally do all the work and assume all the responsibility.

After prospering for about a year with that style of organization the constitution and by-laws were radically changed and the present style of organization was brought into being. The club is now organized after the prevailing plan of automobile clubs, with a board of governors, having full authority to look after its welfare.

The present officers of the club are: Charles E. Firestone, president; Norman O. Aeby, first vice-president; Charles C. James, second vice-president; Arthur M. Crumrine, secretary, and Herbert A. Mason, treasurer. These officers, with the exception of the secretary and augmented by Perin B. Monypeny, Nelson J. Ruggles, William M. Frisbie, N. J. Hanly and the Rev. J. H. Dodshon, constitute the board of governors.

One of the first steps taken by the club was to establish headquarters in the Northern Hotel building, near the corner of High and Goodale streets. The club rooms are located on the ground floor and have been fitted up in excellent taste by the house committee. As shown in the accompanying pictures, the rooms have spacious lounging and smoking apartments, a private meeting room, a secretary's office, cut off from the main room by a railing, and a reading room.

Tasty tapestries and draperies have been used to beautify the retreat and lounging room, which is fitted up with various colored electric lights. Servants are in attendance at all hours to look after the needs of the club members and their guests.

With the change of the constitution and by-laws Secretary Crumrine has originated a plan of holding a social session every Monday evening. The members readily accepted the idea and every Monday night sees a large number in attendance. A "Dutch lunch" is served and varied attractions are provided for

the amusement and instruction of the members. Upon those occasions music is one of the features and singing and dancing often follow. This plan has done much to foster enthusiasm in the club and has proved quite a help toward the enrollment of dozens of motorists in the organization.

But it is not in social matters that the club has taken a foremost position. Through its legislative committee it has kept a close watch on laws and prospective laws and during the session of the Ohio General Assembly of 1910, which has just adjourned, it was through its efforts that no change was made in the present Ohio automobile law. The club co-operates with the automobile clubs of Cincinnati, Cleveland, Dayton and other Ohio cities in looking after legislative matters. The club has united with the Ohio State Automobile Association, which has grown into a strong and efficient organization, to further the interests of the 35,000 automobile owners in the Buckeye State.

The club has erected danger and road signs over all the leading highways in the central part of the State. It has co-operated with clubs of Zanesville, Dayton, Springfield, Chillicothe, Marion and other cities, to place legible road signs all over the State of Ohio, thus aiding the tourist who may be traveling strange highways.

The club has gone on record time and again against the reckless driver and the scorcher. Always ready to uphold the law, it has become popular in a community where the feeling several years ago was intense against the autoist. The club frowns upon the man who jeopardizes the status of the 2,500 autoists in Franklin county, by disregarding the speed laws and the traffic regulations of the city. Yet, on the other hand, the club is always ready to defend its members who may be accused unjustly of reckless driving.

The Columbus Motor Show, held during Christmas week, 1909, under the auspices of the Columbus Automobile Club, was an unqualified success. While the attendance was not as large as was expected, still, judging from the number of cars exhibited and the enthusiasm displayed, no show was more of a success. The club proposes to make it an annual event and committees will soon be named to make the preliminary arrangements.

The annual Orphans' Day has become a feature of the activities of the club. In 1909 about 1,800 deserving children were given an outing at the grounds of the Columbus Country Club and not a mishap marred the occasion. The 1910 Orphans' Day at Big Darby Park, 13 miles west of the city, June 22, was a marked success. About 300 motor cars were used to haul at least 2,000 children to and from the park. A luncheon was served and numerous amusements provided.

When the club turned its efforts to securing better roads for Franklin County and Central Ohio, the roads of this section were known throughout the State as the worst in Ohio. That condition has been improved materially in the short time the club has been in existence and the roads of Central Ohio favorably compare with those of other parts of the State. There is still considerable to be done in that direction and the club has

pledged itself not to cease working until the roads are in a perfect condition.

The recovery of stolen automobiles is a point that should not be overlooked in giving a résumé of the activities of the club. Co-operating with the police department and the State automobile department, the Columbus Automobile Club has been instrumental in recovering quite a number of stolen cars. The culprits have also been punished through the efforts of the club.

A stenographer, to take letters from the members, has been one of the things that has made the club popular among busy men. Other conveniences, such as telephone service, messenger service, etc., are provided.

From the small beginning the organization has grown to a membership of about 660. There are several classes of membership, including active, honorary and associate. A large proportion of those enrolled belong to the active list.

One of the best services the club has done for Ohio motorists was the fight against the principle of municipalities enforcing licensing ordinances. An ordinance of that character was on the books of Columbus and the club filed an injunction suit to prevent the city auditor from collecting the city tax fees. After fighting through the lower courts the club was rewarded with victory in the Ohio Supreme Court, which held that no municipality had authority to enforce an ordinance providing for licensing or registering motor vehicles. This decision relieved the thousands of auto owners in Ohio from a double fee for registration of their cars in addition to the usual practice of assessing them as personal property.

In fact, the club aims to carry out the objects of the organization, which are stated in the constitution to be as follows: "The promotion of a social organization or club composed in whole or in part of persons owning automobiles for personal or private use. To afford a means of recording the experiences of members and of others using automobiles. To promote original investigation in the development of motor carriages. To co-operate in securing rational legislation and the formation of proper rules and regulations governing the use of automobiles in city and country, and to protect the interests of owners and users of automobiles against unjust and unreasonable legislation, and to maintain the lawful rights and privileges of owners and users of all forms of self-propelled vehicles, whenever and wherever such rights and privileges are menaced. The encouragement and development in this country of the automobile. To promote and encourage in all ways the construction and maintenance of good roads and the improvement of the existing highways, and generally to maintain a social club devoted to the automobile and its vogue. To encourage the erection of road and distance signs at cross-roads and dangerous places. To promote the sport of automobiling whenever and wherever it can."

The chairmen of the various standing committees are: Membership, Herman Hoster; Legislative, William M. Frisbie; Show and Contest, Perin B. Monypeny; Good Roads and Road Signs, Herbert A. Mason; Auditing, O. H. Perry; House and Entertainment, Nelson J. Ruggles, and Publicity, Charles C. Janes.

Coming Events in the Automobiling World

Jan. 7-14, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Pleasure Car Division, Association of Licensed Automobile Manufacturers.
Jan. 16-21, 1911...New York City, Madison Square Garden, Eleventh Annual Show, Commercial Division, A. L. A. M.
Jan. 28-Feb. 4, '11...Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc. Pleasure Cars and Accessories Exclusively.
Feb. 6-Feb. 11, '11...Chicago Coliseum, Tenth Annual National Automobile Show Under the Auspices of the National Association of Automobile Manufacturers, Inc. Commercial Vehicles, Pleasure Cars, Motorcycles and Accessories.
Races, Hill-Climbs, Etc.
July 1-4...Indianapolis, Ind., Track Meet. Cobe Trophy Race—Speedway Track, Chicago Auto. Club.

July 1-10...Los Angeles, Cal., Road Carnival of Licensed Dealers.
July 2-4...Los Angeles, Cal., Speedway Meet.
July 2-4...Wildwood, N. J., North Wildwood Automobile Club, Speedway Races and Club Run.
July 4...Auburn, N. Y., Hill Climb of Automobile Club of Auburn.
July 4...Cheyenne, Wyo., Track Meet of Cheyenne Motor Club.
July 4...Dallas, Tex., Track Meet of Dallas A. C.
July 4...St. Paul, Track Meet of Minnesota State Automobile Association.
July 8-9...Grand Circuit Meet, Churchill Downs, Louisville, Ky.
July 9...Hill Climb, Morison, Col.
July 9...Plainfield, N. J., Hill Climb of Plainfield Automobile Club.
July, Middle of...Richfield Springs, N. Y., Hill Climb.
July 28-30...Detroit, Mich., Summer Meeting Society of Automobile Engineers.

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AMONG the great problems which make up the economic situation, the position of the farmer is the first to be taken into account, and anything that will keep the farmer's son from coming into town, thus adding to an already congested situation, will be a step in the right direction. But if the farmer's son is wanted in the field, it is not too much to surmise that a set of conditions must be induced and maintained, the character of which will be in keeping with the grown-up ideas which now pass current among rural women folks. That the automobile is the best bait that was ever offered for the purpose of bringing harmony into these relations is now an established fact.

* * *

TWENTY-FIVE gallons of gasoline, even assuming that it is enough of a storehouse of energy to furnish the force which will drive an automobile for 250 miles, will run out sooner or later, and the bottom of the tank frequently "lights up" with the unfortunate autoist three miles from the nearest place of replenishing. The trouble is that the gasoline is bound to run out no matter how big the tank, and the last drops depart as silently as the first gurgle out of the tank. There is one remedy which is applied from time to time; it takes on the form of an auxiliary gasoline tank, which is placed on the dash or elsewhere. The trouble with the remedy lies in the fact that the poor autoist does not know when the main tank is empty, nor is he advised when the auxiliary

tank is being drawn upon, so that the only difference between the original trouble and that which comes with the auxiliary tank is in a gallon of gasoline. If some means could be provided which would tell the autoist when the main tank is empty, he would have sense enough to shape his course for a new supply within a distance which could be covered by the force of the fuel within the auxiliary tank.

* * *

LUBRICATION is being examined with a critical eye. One phase of it is occupying the attention of the readers of THE AUTOMOBILE at the present time—force lubrication being the subject. It is a great misfortune, the fact that every author in describing a system lays so much stress upon it that all other systems are cast in a shadow. The life of an automobile is absolutely dependent upon the efficacy of the lubricating system. It is also a fair statement that a bearing which will not thrive under ordinary conditions will survive under conditions of force lubrication.

* * *

ANY system of lubrication which depends upon force, otherwise than that due to gravity, works when the mechanism is in working order.

* * *

THE force of gravity is working all the time.

* * *

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THE AUTOMOBILE

Vol. XXII

Thursday, June 30, 1910

No. 26

THE CLASS JOURNAL COMPANY

H. M. SWETLAND, President

A. B. SWETLAND, General Manager

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AMONG the great problems which make up the economic situation, the position of the farmer is the first to be taken into account, and anything that will keep the farmer's son from coming into town, thus adding to an already congested situation, will be a step in the right direction. But if the farmer's son is wanted in the field, it is not too much to surmise that a set of conditions must be induced and maintained, the character of which will be in keeping with the grown-up ideas which now pass current among rural women folks. That the automobile is the best bait that was ever offered for the purpose of bringing harmony into these relations is now an established fact.

* * *

TWENTY-FIVE gallons of gasoline, even assuming that it is enough of a storehouse of energy to furnish the force which will drive an automobile for 250 miles, will run out sooner or later, and the bottom of the tank frequently "lights up" with the unfortunate autoist three miles from the nearest place of replenishing. The trouble is that the gasoline is bound to run out no matter how big the tank, and the last drops depart as silently as the first gurgle out of the tank. There is one remedy which is applied from time to time; it takes on the form of an auxiliary gasoline tank, which is placed on the dash or elsewhere. The trouble with the remedy lies in the fact that the poor autoist does not know when the main tank is empty, nor is he advised when the auxiliary

tank is being drawn upon, so that the only difference between the original trouble and that which comes with the auxiliary tank is in a gallon of gasoline. If some means could be provided which would tell the autoist when the main tank is empty, he would have sense enough to shape his course for a new supply within a distance which could be covered by the force of the fuel within the auxiliary tank.

* * *

LUBRICATION is being examined with a critical eye. One phase of it is occupying the attention of the readers of THE AUTOMOBILE at the present time—force lubrication being the subject. It is a great misfortune, the fact that every author in describing a system lays so much stress upon it that all other systems are cast in a shadow. The life of an automobile is absolutely dependent upon the efficacy of the lubricating system. It is also a fair statement that a bearing which will not thrive under ordinary conditions will survive under conditions of force lubrication.

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ANY system of lubrication which depends upon force, otherwise than that due to gravity, works when the mechanism is in working order.

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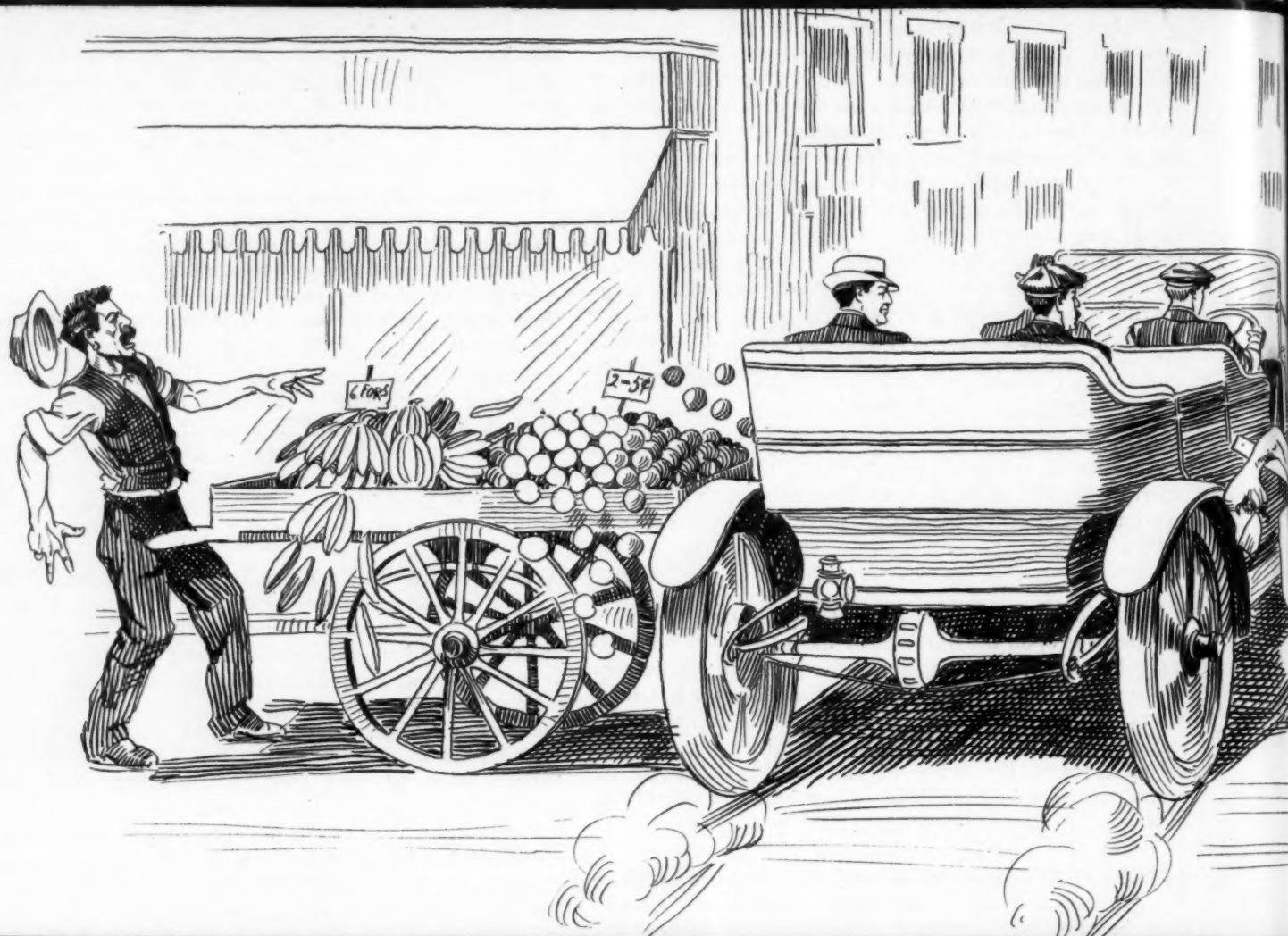
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SEEN IN NEW YORK—JUDGING DISTANCE IS JUST AS MUCH OF A PROBLEM FOR THE EXPERIENCED

Dull Week in Detroit Brings Out Three or Four Companies

DETROIT, June 27—The Evans Motor Car Company is being formed by R. H. Evans, ex-president of the Zenith City Telephone Company, of Duluth and Superior, to build a commercial wagon of, perhaps, 1,000 pounds capacity. Mr. Evans has secured the Marine City Iron Works plant at Marine City, Mich., for his plant, but will have his main offices in this city.

At Flint, the L. A. W. Aeroplane Company has been formed, and has the construction of its first machine well under way. This will be a biplane and will carry the L. A. W. rotating engine, made at Providence, R. I. The steering device was designed by W. L. Marr, designer of the Buick machine, who will be connected with the company, as will, also, Z. D. Boning, formerly associated with Count Zeppelin in Germany.

In the Bauer Steel Body Company, organized here last week, the accessory field gains a prominent member. This concern will build, not only steel bodies for commercial and pleasure cars, but also radiators, and other steel parts. The capital stock is \$20,000, all paid in. The stockholders and officers are: Charles W. Roseberg, president; M. C. Bauer, vice-president and superintendent; Milton C. Hirschfield, secretary and treasurer. The factory will be located at Warren avenue and Fifteenth street, and will open for active operations July 1.

The Champion Ignition Company, of Flint, has increased its capital stock from \$60,000 to \$100,000.

The Lincoln National Bank has made application to the

United States Comptroller for a charter. The bank is to have a capital of \$500,000 and a surplus of \$100,000. Many prominent and well-known members of the trade are interested, among whom are: Frank Briscoe, president Briscoe Mfg. Co.; E. S. George, proprietor Standard Auto Company; E. A. Skae, president Gommer Mfg. Co., manufacturing steering gears, etc.; Homer Warren, president Warren Motor Company, etc.

The town of Dearborn is also to have a new bank, incorporated as the Dearborn State Bank. The new concern has purchased the assets of the D. P. Lapham private bank.

The factory of the Sibley Motor Car Company, out at the West End, has been finished and the company is now moving in. This is a large one-story structure, located at Solvay and Mackie avenues. The company is placing on the market a four-cylinder runabout, known as the Sibley 20, to sell at \$900.

Sixty-eight thousand dollars is the valuation placed on the new factory of the Regal Motor Car Company, in the building permit.

This unprecedented amount of building and the consequent expansion of the various factories has kept the help problem more to the fore than never before. Good workmen are becoming scarce, despite what other trades characterize as ruinous wages.

Third on the list of Detroit's municipal fire wagons is the machine which has just been accepted and placed in service at



AUTOIST AS LEARNING TO DRIVE IS TO THE BEGINNER—LEARN TO JUDGE DISTANCE

Hose Company Number One, Wayne and Larned streets. This, like its successful predecessors, is a combined chemical and hose wagon.

Great preparations are being made to entertain the Elks, during their convention here the week of July 11. A big automobile reception has been planned for July 15, which the committee in charge is attempting to make the largest automobile affair ever held, both in point of number of cars in line, and in superiority of decorations. To add incentive to the latter, the following prizes have been announced: Sweepstakes prize, silver cup, gold lined, 30 inches high for the best decorated car in the parade; ladies' prize, iced tea set, silver tray and complete cut glass outfit, for the best decorated car driven by a lady; gasoline pleasure cars, first prize, chest of silver; second prize, silver punch bowl; third prize, complete automobile picnic hamper; electric pleasure cars, first, chest of silver; second, cut-glass punch bowl; third, cut-glass water set; comic division, first, Tiffany electric lamp; second, gold scarf pin and cuff link set; third, four gold-plated spark plugs; commercial division, first, gold-lined silver cup 25 inches high; second, gold-lined silver cup, 22 inches high; third, gold-lined silver cup, 18 inches high. Only one of these prizes can be won by any one car. In addition, the Hudson Motor Car Company has offered prizes totaling \$50 in value for the best decorated Hudson cars in line, and it is expected that other car makers will follow suit.

Saturday saw the return home of the Regal Plugger, after traveling some 22,000 miles. The car was welcomed by a truck containing a brass band, and a cavalcade of nearly 100 Regal cars and many others. This car, bedecked with labels from all

over the United States, has been placed on exhibition in the local sales agency on Woodward avenue.

Another new company entered the local field yesterday, when the Walker Motor Company incorporated with \$150,000 capital. The principal stockholders are: G. S. Grantlung, John E. Armstrong, and Thomas E. Morehead.

The latest addition to the industry here is the Bower Roller Bearing Company, of Dayton, O., which is to give up its Ohio home. For this purpose, the company has reincorporated under Michigan laws with a capital of \$250,000. The officers are: R. F. Bower, president; C. H. Heller, secretary.

The E-M-F Company has purchased a tract of land, comprising a total of five acres in Pontiac, fronting on Grove, Baldwin and Howard streets, and lying along the Pontiac, Oxford & Northern Railroad, adjoining the property of the Monroe Mfg. Co., in which the E-M-F Company owns a controlling interest. On this land a large body-building plant to employ 1,000 men will be erected, work starting this month. The present wooden buildings of the Monroe company will be torn down and replaced by brick structures, which will be strictly fireproof. When the new buildings are completed the top department, now housed in the old phaeton building on Willow street, will be removed to the new plant.

From the same city, Pontiac, comes the announcement of the formal transfer of the Welch Motor Car Company, with its plant, good will, and all assets, to the General Motors Company. While it has been generally understood that the Welch company was one of the General Motors components, the formal transfer has just been made.

S. A. E. Plans Important Summer Meeting

DETROIT, June 27—The summer meeting of the Society of Automobile Engineers will be held in Detroit, July 28-30. As a result of the active campaign that is being made, this society is occupying an important position in the automobile industry. The July meeting will be the largest and most interesting in the history of the organization, owing to the feeling throughout the membership that under energetic administration, much of the work which should be undertaken by the S. A. E. will be carried to a successful conclusion.

The local Detroit committee on the meeting is constituted as follows: Howard E. Coffin (ex officio), H. W. Alden, chairman, George W. Dunham, Russell Huff, H. M. Leland, F. E. Watts, E. T. Birdsall, A. P. Brush, F. H. Floyd, G. M. Holley and G. E. Merryweather. Various sub-committees are made up of members of this committee.

The program for the different sessions of the convention has been framed as follows:

Thursday, July 28—Morning, business session; afternoon, reading and discussion of professional papers; evening, society dinner, and reading and discussion of professional papers.

Friday, July 29—Morning, visits to manufacturing plants; afternoon, lunch on a yacht, and reading and discussion of professional papers; evening, visit to Light House Inn, participated in by the ladies attending convention.

Saturday, July 30—Morning, reading and discussion of professional papers; afternoon, visit to new Michigan Central Railroad tunnel.

The proposed list of Detroit manufacturing plants to be visited includes the following: Cadillac Motor Car Company, Packard Motor Car Company, E. M. F. Company, Chalmers Motor Company, Burroughs Adding Machine Company, Aluminum Castings Company, Gear Grinding Company, Detroit Steel Products Company, Timken-Detroit Axle Company.

"Little Glidden" Has Thirty-eight Entries

MINNEAPOLIS, June 27—Dates for the second annual endurance run for the Minnesota State Automobile Association's prizes are set definitely as July 22 to 27.

The first day's run will be from St. Paul to Mankato, 168.2 miles; the second day's, Mankato to Sioux Falls, 172.2 miles; the third day's, to Redwood Falls, 168.8 miles, and the fourth day's to Minneapolis, 154 miles; total, 658.2 miles.

Officials selected are as follows: Dr. C. E. Dutton, Minneapolis, referee; C. H. Harrington, St. Paul, pilot; W. E. Roby, Minneapolis, chief observer; L. A. Wood, St. Paul, chief checker; Frank M. Joyce, Minneapolis, superintendent of non-contestants; C. F. Philip, St. Paul, superintendent of arrangements; Howard Kahn, St. Paul, publicity agent.

Grand Circuit Meet at Louisville

LOUISVILLE, June 27—America's Grand Circuit of auto races will be opened in Louisville Friday and Saturday, July 8 and 9, at Churchill Downs. Manufacturers and star drivers as well as the sport-loving public are showing the liveliest interest in the details of the coming meet, which will be under the management of Homer C. George and W. H. Wellman. The circuit includes: Cincinnati, Columbus, Detroit, Pittsburg, Washington, Baltimore, Providence and Boston.

The local program provides eight races daily ranging from five to twenty miles. Along with the professional events are local races, one at five miles for the Louisville championship and the other a five-mile handicap. In these events only local cars and driven by residents of the city will be allowed to start. Handsome trophies are offered. On the second day a race will be run open to all cars in Kentucky, Ohio and Indiana to give amateurs from those States an opportunity to meet the local flyers.

Offers Blue Book as Prize

SYRACUSE, N. Y., June 27—At a meeting of the Automobile Club of Syracuse, held Thursday, twenty-three new members were elected, giving a total of 530. The ambition of the officers now is to raise this total to 700 before January 1, and they are confident that it will be done. The weeks preceding the State Fair auto races are expected to be fruitful ones.

The club has offered prizes to the members bringing in the most recruits. For the best record in any month there will be awarded a copy of the 1910 Blue Book.

Brooklyn Dealers Plan Run

Announcement is made by the members of the Brooklyn Motor Vehicle Dealers' Association that they are to hold a two-day reliability contest on Long Island during the latter part of July. The contest will be in the form of a tour, approximately averaging 200 miles for each day. It is not intended to be a pleasure tour but a strenuous test. Aside from the contesting division there will be a tourist section, in which contestants will compete in secret time. Fifteen entries are assured, although entry blanks have not as yet been issued.

More Prizes in Cobe Trophy Race

The Bosch Magneto Company announces that it will award cash prizes amounting to \$600 to the first three cars in the Cobe Trophy race to be held July 4 on the Indianapolis Speedway. The purse will be divided, \$300 to the winner; \$200 to the second, and \$100 to the third. The proviso and only condition imposed is that the cars so rewarded shall be fitted with the Bosch Magneto.



EXAMPLES OF RAILROAD TRACK WORK INDULGED IN BY PARTICIPANTS IN THE GLIDDEN TOUR, AT TERRAL,

German Air Line, with Through Sleeper

Travel by schedule through the air will be instituted in the near future when the liner Deutschland, of the German Airship Navigation Company, commences its regular runs from Dusseldorf, through the Rhine Valley. The airship, a rigid dirigible 482 feet long by 48 feet beam, which was formerly known as Zeppelin VII, has already made her final trial trip over the 300-mile route. The trip was made at about the speed scheduled for the regular trips. Conditions were ideal throughout the undertaking, but as the summer season in Germany usually contains only a few bad days, the weather enjoyed is not considered unusual.

The meteorological records show that only 43 days in each year may be regarded as stormy in Germany, and almost all of these occur in the winter. The Deutschland is intended to make the 300-mile trip in less than nine hours. The ship is equipped to carry twenty passengers and sleeping and eating accommodations for that number have been made on board. An elevation of 400 feet will be maintained during the flights. Powerful wireless instruments have been installed on the air cruiser. The passenger tariff, which has been issued to the German public, ranges from \$25 for the shortest trip between stations to \$125 for the full route from Dusseldorf to Friedrichshafen.

Changes in Bay State Motor Law

BOSTON, June 27—The members of the Massachusetts Legislature have packed up their things and gone home, and as a legacy have left a few changes in the motor law, which some of them believe are meritorious. They wiped out the section requiring chauffeurs to carry badges. They allowed figures used on the rear of motor cars to be elevated 48 inches from the ground instead of 36. They enacted a reciprocity clause, so that now it matters not how many days another State allows Massachusetts' motorists to use its roads, the visitor from outside has only ten days in any one calendar year to operate in the Bay State, while those States that have restrictions will find their motorists restricted to less than that number, to correspond to the days allowed others in the State they come from.

Another piece of legislation was the changing of the clause relative to sounding the horn at crossroads. The motorists were in favor of abolishing this restriction, which has caused hundreds of needless arrests. However, the legislators provided that out in the country on passing a corner where the view was not obstructed the horns need not be blown. But in the cities it provides that they still be blown, but that no bell, horn or other device for signalling, shall be so sounded as to make a harsh, objectionable or unreasonable noise. Nor shall any driver permit an unreasonable amount of smoke to escape, or make any unnecessary noise. The changes go into effect July 10.

Maryland Motor Law in Effect July 1

BALTIMORE, MD., June 27—All the provisions of the Swann Motor Vehicle Law, recently passed by the Maryland Legislature, will go into effect Friday. All chauffeurs' licenses and certificates of registration under the old law will have to be exchanged for operators' licenses. All the motor-car records heretofore kept by the Secretary of State will be turned over to Commissioner of Motor Vehicles John E. George. The following fees must be paid for licenses:

Class A—Six dollars per annum for each motor vehicle with a rating of 20 horsepower, or less; \$12 for one with a rating of more than 20 and under 40, and \$18 for one with a rating of more than 40 horsepower.

Class B—Three dollars a year for each certificate of registration of a motor vehicle used only for transportation of merchandise.

Class C—One dollar and eighty cents a year for each certificate of registration for a motorcycle.

Class D—Twenty-four dollars a year for each certificate assigning a general distinguishing number or marks to a manufacturer or dealer in motor vehicles other than motorcycles.

The rate of speed shall not exceed 12 miles an hour in the thickly settled or business section of cities, etc.; 18 miles in the outlying districts or more than 25 miles in the open country.

Only such horns for warning signals can be used as are operated by hand pressure.

Munsey Pathfinder Making Progress

BRETTON WOODS, N. H., June 27—The E-M-F Pathfinder, which is laying out the route for the Munsey historic tour, reached this place Saturday.

The car is doing well. Tom Skeggs, who drove it in laying out the "Little Glidden" route this year, is at the wheel. The other members of the party are F. J. Byrne, Harry Ward and E. G. Lynch, of Lazarnick's staff.

During the coming week the pathfinders will lay out the route from Bretton Woods to Burlington, crossing Lake Champlain and continuing down to Lake George, Saratoga, Binghamton and Cooperstown, N. Y.

South Bend Club Elects Officers

SOUTH BEND, IND., June 27—The South Bend Automobile Club elected officers at a meeting held at the Oliver Hotel Friday evening. The following were chosen: Walter Hager, president; Arthur L. Hubbard, vice-president; Jacob Woolverton, treasurer, and A. H. Cushing, secretary. The officers will co-operate with a board of governors to administer the affairs of the club. The board is composed of L. P. Hardy, Edwin Witwer and Dr. George V. Neinstedt.



OKLA. IN THE ABSENCE OF PASSABLE ROADS, SHOWING THE PREMIER, CHALMERS, MOLINE, AND MAXWELL

Knox Wins Feature Events on Port Jeff Hill

(Continued from page 1162)

classifications did better in their cylinder displacement efforts than under the price code. The summary:

No.	Car.	Owner.	Driver.	Time.
44	Knox	Mrs. J. N. Cuneo	L. A. Disbrow	30:64
7	National	C. M. Rutherford	C. M. Rutherford	30:80
9	Zust	D. H. Gaines	Jules Devigne	32:97
49	Stearns	Kingsley Swan	Kingsley Swan	37:91
22	The Only Car	The Only Car Co.	W. D. Sloat	40:29
Event 8A—161-300 cubic inches—				
24	Pope-Hartford	Pope-Hartford Co.	A. G. Wilson	32:32
37	Correja	J. M. Boyle	Jos. Taylor	32:44
25	Pope-Hartford	Pope-Hartford Co.	A. E. Jenkins	33:04
21	S. P. O.	F. J. Horton	F. J. Horton	33:98
32	S. P. O.	Henry S. Lake	John Jonhasg	35:33
18	Buick	Buick Motor Co.	Charles Jones	37:91
56	Lancia	Mrs. J. A. Ferguson	A. Ferguson	40:85
2	Knox	F. E. Ruland	F. E. Ruland	56:56
57	Corbin	H. B. Tucker	H. B. Tucker	1:14:27
Event 9—Stock chassis, 301-450 cubic inches—				
3	Knox	Gerard & Hall	Fred Belcher	28:60
51	Chalmers	Carl H. Page	J. Bell	30:81
7	National	C. M. Rutherford	C. M. Rutherford	31:35
60	Berkshire	Berkshire Auto Co.	F. Wilson	32:56
46	Zust	Am. Zust Mfg. Co.	V. P. Pisanl	32:66
49	Stearns	Kingsley Swan	Kingsley Swan	33:76
28	Chalmers	Sammis & Downer	Schenck Bergen	33:84
20	Velle	R. C. Vandeventer	R. C. Vandeventer	38:92
Event 10—451-600 cubic inches—				
44	Knox	Mrs. J. N. Cuneo	L. A. Disbrow	31:09
9	Zust	D. H. Gaines	Jules Devigne	32:14
Event 12—Amateurs, class B cars, \$1,201 to \$2,000—				
20	Velle	R. C. Vandeventer	R. C. Vandeventer	39:55
5	Jackson	J. H. Dyett	Richard Dyett	1:05:24
Event 13—Amateurs, class C cars, \$2,000 and over—				
7	National	C. M. Rutherford	C. M. Rutherford	31:84
29	National	C. G. Goddard	W. Smith	36:35
50	Chalmers	C. Foster	C. Foster	37:22
56	Lancia	Mrs. J. A. Ferguson	A. Ferguson	39:62
16	Knox	E. B. Hawkins	E. B. Hawkins	1:36:58
Event 14—Amateurs, cars owned in Port Jefferson—				
34	Knox	W. J. Fallon	W. J. Fallon	56:69
5	Jackson	J. H. Dyett	Richard Dyett	1:02:72
Event 15—Amateurs, L. I. A. C. and Crescent A. C.—				
49	Stearns	Kingsley Swan	Kingsley Swan	36:93
35	Buick	H. A. Trimm	H. A. Trimm	52:21

Getting Ready for Galveston Races

GALVESTON, TEX., June 13—Automobilists from all over Texas, and from the North and East as well, are looking forward to the races to be held on Galveston beach, August 3, 4 and 5, as the motor car event of the summer in this State. The president of the Texas State Automobile Association, J. W. Munn, of Galveston, who is also the director for the beach races here, is now making a pathfinding tour of the State, stirring up interest and securing as large an entry list as possible. Encouraging reports from him are being received in Galveston. He has visited Houston, San Antonio, and Austin, and will go to Dallas, Waco, Fort Worth, and Beaumont before he returns.

The events and prizes for the three days are as follows:

First Day, Aug. 3

Event No. 1: Class B, division 2-B, twenty miles; entrance, \$10; prizes, first \$100, second \$25.
 Event No. 2: Class B, division 4-B, thirty miles; entrance, \$10; prizes, first \$150, second \$50.
 Event No. 3: Class B, division 3-B, twenty miles; entrance \$10; prizes, first \$100, second \$25.
 Event No. 4: Class D, free-for-all, fifty miles; entrance, \$15; prizes, first \$200; second \$50, third \$25.

Second Day, Aug. 4

Event No. 5: Class B, division 5-B, twenty miles; entrance, \$10; prizes, first \$150, second \$50.
 Event No. 6: Class B, division 2-B, ten miles; entrance, \$5; prizes, first \$75, second \$25.
 Event No. 7: Class E, special one mile flying start for beach record; entrance \$5; each entrant allowed two trials; prize \$100.
 Event No. 8: Class B, division 3-B, ten miles; entrance, \$5; prizes, first \$75, second \$25.
 Event No. 9: Class B, division 4-B, ten miles; entrance \$5; prizes, first \$75, second \$25.

Third Day, Aug. 5

Event No. 10: Class D, free-for-all, 200 miles; entrance \$25; prizes, first \$500, second \$100, third \$50; for best time first 50 miles \$100, for best time first 100 miles \$150.

The course is to be a five-mile straightaway and return for all races except the 200-mile event, which will be run over the ten-mile course. The course will be roped off for quite a distance, and police patrol will be provided to see that spectators do not get in the way of the racers. A paddock is to be constructed to protect the cars from any rain or bad weather. The beach, which under normal conditions is about 100 feet wide, is in excellent condition this summer, and some fast records are expected.

Capt. Munn, of Galveston, has entered his 40-horsepower National; S. H. Weis, of San Antonio, an 80-horsepower Chadwick; G. A. C. Halff, of San Antonio, a 60-horsepower Stoddard-Dayton, to be driven by Dehymel. Many other entries are looked for within the next few weeks. Entries may be made until July 28. The races will be run under the rules and by the sanction of the A. A. A.

Central Ohio Automobile Items

COLUMBUS, O., June 27—The Ohio General Assembly adjourned recently without amending the Ohio automobile law in the least particular. It was through the efforts of Secretary of State Carmi A. Thompson, Attorney-General U. G. Denman and State Registrar of Automobiles Fred H. Caley that no changes were made in the law.

The Automobile Club of Stark County (Ohio) is arranging for a club run to start July 9 to extend as far as Detroit. It is planned to touch Akron, Cleveland, Toledo, Sandusky and other cities in the run. Eight cars have already been pledged and other entries are expected to be in later.

First Day of St. Louis Run Shows Sixteen Clean Scores

ST. LOUIS, June 30—The three-day reliability run for the St. Louis Star trophy, under the auspices of the St. Louis Automobile Manufacturers and Dealers' Association, started Tuesday morning with 29 contestants in the lists. The Buick pilot car, loaded with confetti, left St. Louis Star square at 5 A. M., and an hour later the first of the contestants was sent away, the others following at 1-minute intervals in their order.

The first day's run took the contestants from St. Louis through St. Charles, Wentzville, Harvester, Cottleville, Darden, Flint, Moscow Mills, Troy, Eolia, Clarksville, Louisiana, New London and Hannibal, a distance of 141.1 miles.

The second day's run was from Hannibal through Palmyra, Monroe, Hunnewell, Shelbina, Clarence, Macon, Excello, Jacksonville, Moberly and to Mexico, distance, 143.3 miles. The third day's run will end at St. Louis, the tour passing through Wells-ville, Montgomery, Jonesburg, Warrenton, Truesdale, Middleton, Wright City, Forestel, Wentzville, Darden, Cottleville, Harvester and St. Charles.

The officials of the run are: Referee, J. D. Perry Lewis of the Halsey Automobile Company; starter, Robert E. Lee; pilot, W. R. Crusoe. The checkers at controls are Samuel Breadon, Charles E. Mitchell, and H. W. Blodgett. The contest committee, Frank R. Tate, John H. Phillips and C. E. Mitchell.

At the conclusion of the tour, Thursday evening, the cars finishing will be driven to the official garage, where the final inspections will be made. The Star trophy, a handsome cup, will be awarded to the car which shall have finished with the most nearly perfect score. Should two or more cars tie for the highest score, the contest committee will arrange a special run

for final decision, over the same or a harder course.

In addition to the touring car and runabout classes, the contestants are listed in four divisions—Cars valued at \$3,500 or over, second, at \$2,001 to \$3,499; third, at \$1,001 to \$2,000; fourth, at \$1,000 and under. A 15-mile schedule is observed for cars of the first division; 14-mile for second division; 13-mile third; and 12-mile fourth. The first day's score follows:

No. Car	Entrant	Driver	Score
1—Overland	C. E. Goldthwale	C. E. Goldthwale	1,000
2—Moon	Eli Collutte	R. Weinbert	971
3—Buick	Frank De Laney	C. H. Blake	1,000
4—Maxwell	Val. Heinrich	G. H. Houghton	998
5—Oldsmobile	B. K. Olin	John Grenninger	Dis.
6—Mitchell	C. M. Barnard	Marcus Wolf	990
7—Oldsmobile	W. B. Fewell	T. A. Goodman	1,000
8—Cadillac	W. F. Bagnell	W. F. Bagnell	1,000
9—Moon	E. J. Moon	Ed. Moore	975
10—Rambler	Will Smythe	J. H. Ramsden	Dis.
11—Dorris	J. T. Rumble	Ed. Gadsey	1,000
12—Moon	Mathew Blavalt	Ed. Gillespy	998
13—Columbia	E. E. Ernest	J. C. Graham	1,000
14—Buick	James Ladd	Charles Berkley	1,000
15—Everitt	A. J. Whittaker	Frank Morris	994
16—Mitchell	J. H. Little	W. F. Young	993
17—Ford	H. L. Bagley	Dr. H. A. Upshaw	1,000
18—Pope-Hartford	Walter Saigeon	Fred Schmidt	999
19—Haynes	Carl Williams	Carl Williams	1,000
20—National	C. Mers	H. S. Reed	1,000
21—Interstate	H. M. Paine	H. M. Paine	1,000
22—Buick	N. C. Tuxbury	H. Paul	1,000
23—Stearns	J. M. Dunwoodie	J. M. Dunwoodie	1,000
24—Hupmobile	Roy Anselm	J. A. Hutchinson	975
25—Dorris	J. E. Baker	K. Funsten	1,000
26—Marmon	Ed. Holthaus	Ed. Holthaus	977
27—Amplex	H. L. Schure	H. L. Schure	1,000
28—Moline	W. von Stelger	J. E. Foland	1,000
29—Stearns	D. B. Brownback	D. B. Brownback	994
30—Haynes	A. A. Franklin	A. A. Franklin	886

In addition to the pilot car and the contestants, there is a Dorris car for the officials and a Standard Six for representatives of the press.

Live Problems Discussed at A. L. A. M. Meeting

At a well-attended meeting of the Association of Licensed Automobile Manufacturers, yesterday, it was reported that the final hearing on the interlocutory decree before Judge Hough in the Ford and Panhard cases has been definitely fixed for the morning of July 19. The testimony on both sides in the supplemental bills and answers has been closed, and now only awaits the hearing of the application for the entry of decrees.

Aside from routine business, there was a general discussion of trade conditions, which showed a continuance of the healthy demand for motor cars, that are now such an essential part of American life, and particularly a strong demand for freight-carrying cars. Reports and figures of the manufacturers indicated very clearly the reason why bankers and railroad men have been decrying the buying and using of automobiles, as the motor-car builders say that many people are buying motor cars now instead of putting their money into Wall Street stocks with their usual uncertainty.

The executive committee of the association held its meeting on Tuesday, while there was also a meeting of the directors of Association Patents Company, at which Alfred Reeves was elected secretary and treasurer in the place of Coker F. Clarkson, who resigned to become secretary of the Society of Automobile Engineers.

President Clifton presided, and among those in attendance at the board meeting were: James Joyce, American Locomotive Company; John S. Clarke, Autocar Company; G. A. Lambert, Buckeye Manufacturing Company; C. C. Hildebrand, Chalmers Motor Company; H. W. Nuckols, Columbia Motor Car Company; M. S. Hart, Corbin Motor Vehicle Corporation; R. M. Brownson, E-M-F Company; G. H. Stilwell, H. H. Franklin Manufacturing Company; Elwood Haynes, Haynes Automobile Company; F. O. Bezner, Hudson Motor Car Company; G. A. Matthews, Jackson Automobile Company; A. N. Knox, Knox Automobile Com-

pany; S. T. Davis, Jr., Locomobile Company of America; S. Regar, Lozier Motor Company; Horace DeLisser, Maxwell-Briscoe Motor Company; Wm. T. White, Mercer Automobile Company; Wm. E. Metzger, Metzger Motor Car Company; A. C. Newby, National Motor Vehicle Company; C. C. Hanch, Nordyke & Marmon Company; C. R. Hatheway, Oakland Motor Car Company; L. H. Kittredge, Peerless Motor Car Company; Charles Clifton, Pierce-Arrow Motor Car Company; George Pope, Pope Manufacturing Company; R. M. Owen, Reo Motor Car Company; Geo. J. Dunham, Royal Tourist Car Company; G. E. Mitchell, Alden Sampson Manufacturing Company; R. H. Salmons, Selden Motor Vehicle Company; R. F. York, F. B. Stearns Company; E. L. Thomas, E. R. Thomas Motor Company; Windsor T. White, Waltham Manufacturing Company; Geo. W. Bennett, Willys-Overland Company; Thos. Henderson, Winton Motor Carriage Company, and Alfred Reeves, general manager.

Seventeen Starters in Denver Post Run

CHEYENNE, WYO., June 28—Seven perfect scores were made in the first of the five days' reliability contest promoted by the Denver Post, which started this morning from Denver. The Renault, Studebaker, E-M-F, Jackson, Buick, Rambler and Haynes were in this category, while those penalized included: Reo, 3; Flanders, 103; Hupmobile, 19; Regal, 10; Brush, 8; Gleason, 111; No. 15, Page, 18; No. 16, Page, 13; Firestone-Columbus, 49; Apperson, 10. The Gleason was assessed 100 points for careless driving. To-night it was raining hard, and it is indicated that the run to-morrow back to Denver, a distance of 115 miles, will be a tough one. Thursday the run goes from Denver to LaJunta, 181 miles, and Friday from LaJunta to Hugo, 200 miles. Saturday the cars return from Hugo to Denver, 208 miles.

Winton Continues Sixes for 1911

(Continued from page 1167)

ternal expanding brakes. In addition to the torsion rod as shown, there are radius rods extending from the extremities of the axle to the chassis frame.

(J)—Left hand side of the six-cylinder motor showing the carburetor in place, and how the intake manifold extends from the carburetor orifice up and over the cylinders, terminating in Winton design of distributing manifolds, so arranged as to deliver an equal weight of mixture to the respective cylinders. The piping of the self-starting system may be plainly seen in this view, and priming cocks are so placed that they are accessible. The carburetor is above the line of the chassis frame, so that it is accessible.

(K)—View of the power plant, looking down from a position at the left and rear of the chassis, showing the method of suspending the motor, the relations of the parts, notably the control system, also the foot pedals for the clutch and brakes, and the equalizer, by means of which the brakes on the two wheels act in unison. The side levers here come into view, and the mechanism which is employed in the selector system is in a dust-proof housing at the right side of the transmission gear case. The offset at the narrowing point of the chassis frame is laterally supported, and the foot boards are attached to pressed steel brackets.

Choices Given to Patrons for 1911

The choices which will be given the Winton patrons for 1911 are as follows:

Car complete with touring, runabout, or toy-tonneau body, \$3,000; the torpedo body will be furnished at \$250 more, and the

car complete, with a limousine body, will be \$4,250; with a landaulette body \$4,500; the chassis without body will go for \$2,750; and the touring body separately is listed at \$500, which is also the price of the runabout and toy tonneau body; a separate limousine body may be had for \$1,500, and the landaulette at \$1,750. One of the Winton ideas for this year is to offer the chassis with two bodies, and if the purchaser elects to take a limousine and touring body, the price will be \$4,500, or, if the selection is a landaulette and touring body, the price will be \$4,750; the touring body, however, seats five, and if a seven-passenger touring body is ordered instead, it will be at an extra of \$250. The equipment, which is listed as regular, includes two gas head lamps, two oil side lamps, and one oil tail lamp, gas tank or generator, horn, and full set of tools. A locker is provided under each seat, but the front seat locker is of the drawer type, and is partitioned to accommodate the tools. The color options are royal purple, blue, green, gray, maroon, and red. The finish is up to the customary Winton standard, which includes layer upon layer of the finest paint and varnishes, sufficiently to obtain the highest possible carriage excellence. This, together with the straight line style of design of body work, accounts for the particular distinctiveness which draws attention to Winton automobiles on the road.

Peculiarities of Modern Non-Charring Brake Linings

(Continued from page 1176)

fer to take chances rather than to give the subject, in the light of a concrete application, the real attention it deserves, with the result that brakes, for illustration, are not always the success that they would have users believe.

The Renne experiments, dating back to 1829, still offer information to the designer who has to deal with unlubricated friction, as when brakes are being designed. The conclusions then reached, which have not been disproven since that time, may be restated as follows:

(A)—The law of solid friction differs with the character of the rubbing bodies.

(B)—With wood, metal, and stone, within limits of abrasion, friction varies only with pressure, being independent of extent of surface, time of contact and velocity of rubbing.

(C)—With fibrous materials, friction is increased by increased extent of surface, and by time of contact, but is diminished by pressure and speed.

(D)—The limit of abrasion is determined by the hardness of the softer of the two rubbing materials.

(E)—Friction is greatest with the soft and least with the hard materials.

It is the condition (C) that is most interesting at the present time, owing to the use of brake linings of asbestos, which are much used, or cork inserts, which follow the same law. The first conclusion to reach is: if a set of brakes of the metal to metal sort will not give satisfaction, it is a positive crime to place fibrous materials under identically the same conditions, which limit surface, increase pressure per unit of area, and accomplish all the other crimes of designing, which lead up the narrow alley-way to the goal called failure.

The law says that the fibrous linings will do the best work, (a) with increased extent of surface, (b) by time of contact, but the law also states, (c) ability decreases with pressure, and, (d) with speed of rubbing.

Considering the laws which govern when fibrous materials are employed, what is wanted is:

(A) The greatest possible surface of the linings.

(B) The maximum time of contact.

How is this to be accomplished? Readily, provided the brakes are designed with a large surface, and are placed on the road wheels of the automobile. It must be remembered that as the

wheels (on which the brakes are placed) run slower, the time of contact will be longer.

Cork inserts work with excellent satisfaction when the brake surface is somewhat over 500 square inches on a car which weighs upward of 3,600 pounds.

It would seem as if it will be within the range of possibilities to fix the conditions under which brakes are to work, naming the several conditions as, pressure per square inch for the several available materials, speed of rubbing, which regulates the diameters of drums, taking into account the location and spindle speed which follows.

Glancing at the laws which seem to hold, it is rendered apparent that the same character of materials should not be used at all points, under widely varying conditions. If the speed of rubbing is high, and the pressure per square inch is augmented to exceed that which is good practice for fibrous material and cork, it remains to be seen whether or not the brakes will be quite satisfactory.

For metal to metal, it is important to note that the coefficient of friction decreases with speed; the law is as follows:

"The coefficient of unlubricated friction decreases materially with velocity, is very much greater with minute velocities of $O +$, falls very rapidly with minute increases of such velocities, and continues to fall with decreasing rapidity with higher velocities up to a certain point, following closely the law which obtains with lubricated friction."—Wellington.

As an indication of the rate of decrease of the coefficient of friction of metal to metal, all that the occasion demands for the moment, is to quote an account of the adhesion of steel tires sliding on steel rails. An account is given as follows (Westinghouse & Galton):

Speed in miles per hour....	10	15	25	38	45	50
Coefficient of friction.....	0.11	0.087	0.080	0.061	0.047	0.040

These speeds are all within the practice as it obtains in brake-shoe work, and granting that geographical location will scarcely alter the coefficient of friction, it is readily seen that the brakes are least capable just when they were the most in demand.

Harris' Cadillac Wins Delaware Sealed Time Run

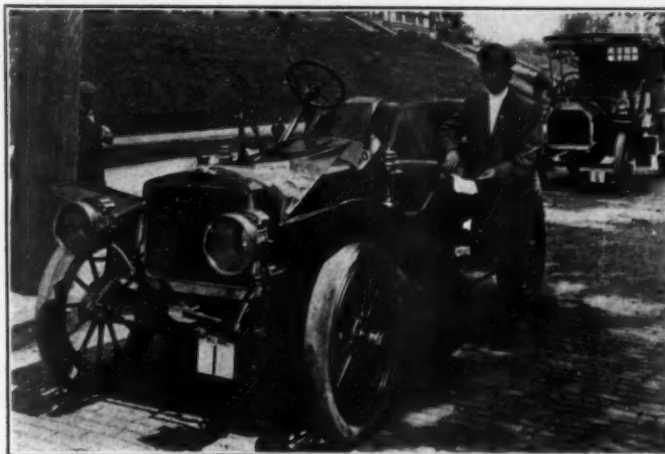
WILMINGTON, DEL., June 27—Coleman B. Harris, in a 30-horsepower Cadillac touring car, was the winner of the sealed time run of the Delaware Automobile Association, from Wilmington to Oxford, Pa., and return, a distance of 72.6 miles, which took place last Saturday. His time was 4 hours and 14 minutes, while the sealed time was 4 hours and 19 minutes. Mr. Harris had the least number of penalizations. By winning the run Mr. Harris will receive a handsome silver loving cup, offered by the association.

Courtland E. Pierson, in a 30-horsepower E-M-F touring car, was second, and John B. Bird, in a 20-horsepower White steamer, was third, but their time was not learned, the run committee of the association, which computed the time, declining to give out any information on the subject, regarding the details, except as to the winner.

While the number of contestants was not large, only eleven entrants starting, it was full of interest, from the fact that the weather was ideal, but also because of several muddy places in the road, in Pennsylvania, there were some unpleasant incidents to record. All got through the bad places, however, without mishap, and none had any trouble in following the route, which was indicated by confetti distributed by Bissel C. Crommon and Charles G. Guyer in the pilot car, which started an hour in advance of the beginning of the run. The start was made from the court house in this city, at 11 o'clock, the cars checking out in the order given in the table below.

There were four checking stations, which were unknown to the entrants. They were as follows: London Grove, A. K. Barker; Oxford, William Stanier; Avondale, Thomas T. Weldin; Lamope, John B. Martin. All of the entrants finished except J. Danforth Bush, who took a run off the course, for the purpose of visiting Elkton, Md. The run was under the man-

agement of a committee comprising A. B. Hazard, chairman; Charles G. Guyer and William Stanier. The entrants finished in the following order:



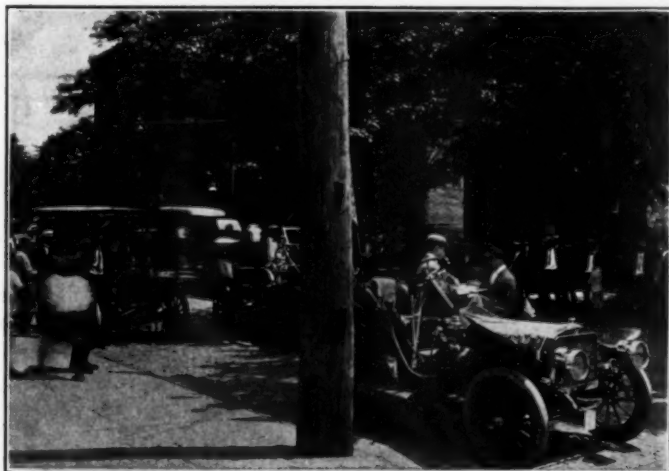
Checking Out the Cars, A. B. Hazard, Chairman of Run Committee

No.	Name of Car	H. P.	Entrant	Driver	Time
1	White Steamer	20	John B. Bird	John B. Bird	4.24
8	Cadillac	30	Coleman B. Harris	Coleman B. Harris	4.14
7	E-M-F	30	C. E. Pierson	C. E. Pierson	4.25
9	Maxwell	12	C. G. Cann	C. G. Cann	4.25½
5	Stanley Steamer	20	T. C. Marshall	T. C. Marshall	4.30
2	Peerless	38	E. M. Pennypacker	E. M. Pennypacker	4.36
6	Stoddard-Dayton	40	Dr. J. C. Fahey	Frank Chadwick	4.36
11	Stevens-Duryea	24	John R. Wilson	John R. Wilson	4.36½
10	Apperson	30	H. D. Ross	A. M. Otteen	4.41½
4	Stevens-Duryea	24	Wm. C. Corey	Wm. C. Corey	4.55
3	Courier	22½	J. Danforth Bush	J. Danforth Bush	Did not finish

Delaware Achieves Reciprocity

WILMINGTON, DEL., June 27—Automobilists in Delaware now enjoy reciprocal relations with Maryland as well as with Pennsylvania.

This is welcome news to owners of cars in this State, in view of the fact that it is now possible to go to either Philadelphia



Cars Assembling for the Start at Court House, Wilmington

or Baltimore, or any places in Maryland or Pennsylvania, with Delaware State licenses.

After considering the subject for three years, the Water Witch Fire Company of this city has given contracts for two automobile fire engines, which are to be delivered the latter part of October or the early part of November.

Virginia Automobile News

RICHMOND, VA., June 27—A test is now being made of methods of laying the dust of the city streets, and the process of the Cincinnati Good Roads Company is being tried. The driveways of several of the city parks are being sprinkled with asphalt oil, and the results are expected to prove highly satisfactory. In case these thoroughfares are free from dust as the result of the oil, the thoroughfares of the city, especially the main ones, will be treated and kept in a dustless condition. This move has been agitated for many months by autoists of Richmond, and Councilman Don Levy has fought for it for over two years, but with indifferent success. Now the prospects are bright for the success of the movement.

The license for the first automobile ever built in Richmond was issued to J. A. Grassberger on Friday, and the machine is now in evidence on the city streets. It is a four-seated roadster, of 18 horsepower. The machine was manufactured as an experiment, and it is stated that a regular automobile factory will be started here by an organized company soon, though definite steps have not yet been taken.

To Wind Up Electric Vehicle Company

Judge Joseph Cross, of the United States Circuit Court of the New Jersey district has issued a rule on the creditors and stockholders of the Electric Vehicle Company to show cause. June 27, why the report of the receivers should not be accepted and its recommendations as to distribution of moneys, granted. The receivers have \$22,892 in hand. The chief clause of the report is a petition that the sale of the Electric Vehicle Company's business to the Columbia Motor Car Company be ratified, confirmed and approved.

Studies Involving Refinements of Gasoline Equipment

(Continued from page 1181)

When a motor stops and the ignition system proves to be in good order it is not so difficult to deal with the problem if the interruption is permanent. It then becomes necessary to find out (a) if there is any gasoline in the tank, (b) if the quality of gasoline present is good enough to use, (c) if the carbureter is so adjusted that the gasoline is in the right proportion, (d) if the flow of gasoline from tank to carbureter is stopped.

It is not at all difficult to find out if there is gasoline in the tank. Take the filler cap off, and put a measuring stick in through the orifice and upon withdrawing the same note the height of the wetted surface. If the carbureter floods it is of course a sign that the flow of gasoline is not properly regulated by the needle valve as it is controlled by the float. The first thing to do under such conditions is to note if the needle-valve seat needs tightening; if it does, it is then necessary to find out if the buoyancy of the float is normal. The excess of gasoline must be stopped, no matter to which of these causes it is due, before the mixture can be relied upon to conform to the demands of the motor.

If the gasoline flow is insufficient it will be due to one of the causes above named, and if it is found that there is a quantity of suitable gasoline in the tank, but that it does not flow to the carbureter, it is a self-evident fact that an obstruction in the passageway at some point will be at the foundation of the trouble. In dealing with a new automobile it is always well to look for obstructions which may come in the form of a drop of solder, which frequently flows from the joints which are being sweated, to some restricted lodging point, as the orifice through which the gasoline enters. By taking the system apart and blowing through each member the one having the obstruction will be discovered. Referring to Fig. 3 which is of an auxiliary tank

on the dash, which receives its gasoline under pressure from the tank, it will be observed that the gasoline enters from the tank to the filter, passes through the same, and then to the float chamber or main portion of the tank, under the control of a needle valve, which is lifted through the buoyancy of a float. The filter is so contrived that it may be screwed out, examined, and cleaned if necessary. This operation should be performed at reasonably frequent intervals, and a water basin should be provided in the bottom of the tank so that the accumulation of water, some of which obtains in gasoline, may be drained off as the exigencies of service would demand.

Fig. 4 is a much more promising design of an auxiliary tank for the dashboard, because it is so made as to eliminate the necessity of using a wire filter, which is bound to be more or less of an obstruction, although in this case means are afforded for draining off the water as it accumulates without running the risk of having the water serve as a plug for the gasoline passageways. In this design the gasoline raises up and then passes in through the orifice which leads to the needle-valve seat, and the water, if any is entrained, will lie on the bottom of the well until it is drained off through the water drain. A large inspection cap is provided at the top; it has a leather packing, which makes it easy to screw the cap to tightness, even by hand pressure, although a large hexagon head is available in case wrench tightness becomes necessary. At the bottom of the tank, where the gasoline flows out, there is a standpipe which affords a sufficient water basin by means of the differences in levels, so that clear gasoline will flow through the carbureter and the water will lie in the basin until it is released by opening the drain cock. One of the ideas in presenting this design was to indicate the desirability of making things accessible.

Hughes Signs Anti-Joy-Ride Law

ALBANY, June 27—Governor Hughes has signed the Toombs bill amending the penal law so as to enlarge the scope of the anti-joy riding law of 1909. The former law provides that "Any chauffeur, or other person, who, without the consent of the owner, shall take, or cause to be taken, from a garage, stable, or other building or place, an automobile or motor vehicle, and operate or drive, or cause the same to be operated or driven, for his own profit, use or purpose, steals the same and is guilty of larceny, and shall be punished accordingly."

The law was found to have loopholes which lawyers found for the clients' benefit and this year it was amended by inserting after the words "shall take," the words "use, operate or remove"; and, again, after the words "or cause to be taken" the additional words, "used, operated or removed"; and then again

there is inserted after "place," the words "or from any place or locality on a private or public highway, park, parkway, street, lot, field, inclosure, or space." All of which expands the scope of the law intended to stop the unauthorized use of automobiles by chauffeurs and others.



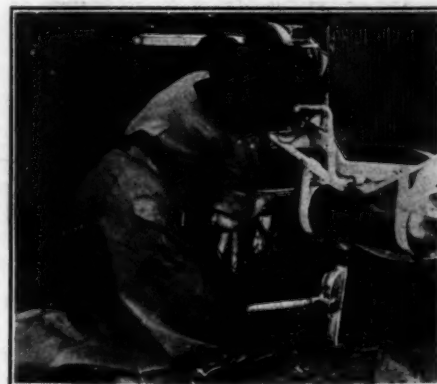
Miss Phillips, one of the Overland crew, toting a block to repair a broken spring

Motoring Activities in Wisconsin Field

MILWAUKEE, June 27—Eighteen cars have been entered in the first annual tour of the Wisconsin State Automobile Association for the Milwaukee *Sentinel* trophy, starting from Milwaukee on Monday morning, July 18, and finishing in that city on Friday evening, July 22. Chairman George A. West of the Contest Board expects another eighteen entries, and believes now that more than twenty-five cars will start.

The entries now on file are: Rambler Garage Company of Milwaukee, branch of Thos. B. Jeffery Co., Kenosha, Wis., two cars; Badger Motor Car Company, Columbus, Wis., two cars; The Kisselkar Company, branch of Kissel Motor Car Company, Hartford, Wis., three cars; Buick Motor Company, Flint, Mich. (Milwaukee branch), three cars; Bates-Odenbrett Automobile Company, Overland; Curtis Automobile Company, Reo; Jonas Automobile Company, Cadillac; Johnson Service Company, Milwaukee, Johnson; Franklin Auto & Supply Company, Franklin; Studebaker Automobile Company (Milwaukee branch), one car, and others, if present indications count for anything.

The 1911 pro-



Miss Scott, the other fair Overlander, blocking up the broken spring



Parry, No. 105, nearing Bowling Green, Ky., in the Glidden Tour

duction of Thomas B. Jeffery Company, Kenosha, Wis., will be 2,500 cars, according to announcement just made at the Rambler works. The number is practically the same as in 1910, and the news may cause some surprise.

Thomas B. Jeffery Company was incorporated last week with a capital stock of \$3,-

000,000. Officers are about to be elected by the company.

Eugene O. Edwards, of LaCrosse, Wis., has invented a new type of gasoline motor. The power is obtained by a revolving motion in the cylinder, instead of the conventional piston stroke, and the ports are in the top of the cylinder. The core of the cylinder forms the water-cooling system, the revolving power wheels being outside of this core. The engine is now being tried out in a gasoline launch. The present motor is in the one-cylinder form, but any number of cylinders up to six can be added without rearrangement.

The National Gauge & Register Company, of Minneapolis, Minn., has moved its plant to LaCrosse, Wis., being the first concern to be attracted to LaCrosse by the new industrial association. The company manufactures eight motor-car accessories and specialties, the invention of Edmond E. Hans, vice-president.

The Mitchell-Lewis Motor Company, of Racine, Wis., will build 2,000 more cars for 1910 delivery than originally intended. About thirty-five cars are being turned out every day and the plant will run all summer.

Future Puzzle for St. Peter

Charles Wells, of the photographing firm of Spooner & Wells, has a reputation for self-contained dignity, moderation and temperance and among the things he particularly abhors is profanity in any form. But, notwithstanding his views and reputation, he came mighty close to the line while he was helping to repair one of the tires of the big Peerless machine in which he was a passenger during the endurance run of the New Jersey Automobile and Motor Club.

The "blow-out" occurred near the new country club house, and Mr. Wells had succeeded in inserting a tire iron between the rim and the shoe and was preparing to give it a yank. Something "beat him to it" and with a grunt the shoe slipped back while the iron, twisting from his grasp, struck him on the thumb with a crack that sounded like a "foul-tip."

The dignified photographer writhed in pain while the crew of the Peerless gathered around him sympathetically.

Mr. Wells, with agony distorting his face, shook the injured thumb woefully and to the intense surprise of the crew exclaimed: "Bob jam the jam thing to jell."

After the pain had subsided he triumphantly pointed to the fact that he had used no profane word even under the trying circumstances.

Road Commission Tests Highways

Starting June 28 from Rochester, the New York State Highway Commission, which has been at work for a year in perfecting an organization and in starting road improvements in a practical way, began a two-day tour of Monroe, Wayne, Ontario, Livingston, Alleghany, Wyoming, Genesee and Orleans counties as guests of the Automobile Club of Rochester.

The commission, its deputies, county superintendents and fieldmen, assembled in Rochester for its semi-annual conference Tuesday. The delegates numbered about 200, and the trip over the roads seemed almost as large as a big endurance run, as far as the number of cars engaged is concerned. The trip was undertaken as a road test and demonstration of the value of the work of the commission so far as it has progressed.

One of the features of the tour was the use of an unique road map constructed during a preliminary trip over the route, which contained comments on every portion of the road, with criticisms as to construction, material and engineering.

Each evening was devoted to meetings, conferences and entertainments, and the final session was held at Charlotte after the trip had been completed. A general discussion of conditions as revealed on the tour was the feature of the last meeting.



The Waverley Electric Hearse—A new and Silent Funeral Car

Plainfield Club's Second Climb

Johnston's Drive on Watchung Mountain will be the scene of the second annual hill climb of the Plainfield (N. J.) Automobile Club, Saturday, July 9. A program of eight interesting events has been arranged. Five of them are under "B" classification, according to piston displacement; one is for small cars selling under \$800; another is a free-for-all of the widest latitude, and the final race is for New Jersey residents, cars to be driven by amateurs.

The hill is 3,996 feet in length and rises 300.5 ft. with a good imitation of a hairpin turn. The average grade is 7.52 per cent. and the going is of a character to test the capabilities of the best cars on the market.

Cups and medals will be awarded, respectively, to the first and second in each of the events, except for the small car event, in which there is only one prize offered. The entry box will remain open until midnight of July 4. W. R. Townsend, Plainfield, N. J., is secretary of the club.

Nashville News of the Automobile

NASHVILLE, July 27—The newly organized automobile club at Nashville has completed plans for its initial run on July 4 and about thirty cars have entered, with prospects that twice that number will take part. The route goes through Shelbyville, Fayetteville, Petersburg, Lewisburg, Culleoka, Columbia, Franklin, and back to Nashville, a distance of 130 miles.

Robert Rhea left Nashville on June 20 in his E. M. F. thirty for a trip of 2,000 miles. Accompanied by Edward Walsh, he is on his way to Colorado Springs, via St. Louis and Kansas City.

Through the influence of Nashville autoists a considerable amount of oiling of roads is being done around Nashville. Several of the leading pikes have been oiled for several miles. The Harding road has just been prepared for six miles.

Nashville and Memphis automobilists have taken up in a vigorous way a project for a great public road or boulevard from Nashville to Memphis, a distance of about 283 miles. The only way the trip can be made now is over the route followed by the Glidden tour through North Alabama. Of the 283 miles, 123 miles is already good road and 26 miles is being built, leaving 134 miles to be arranged for.

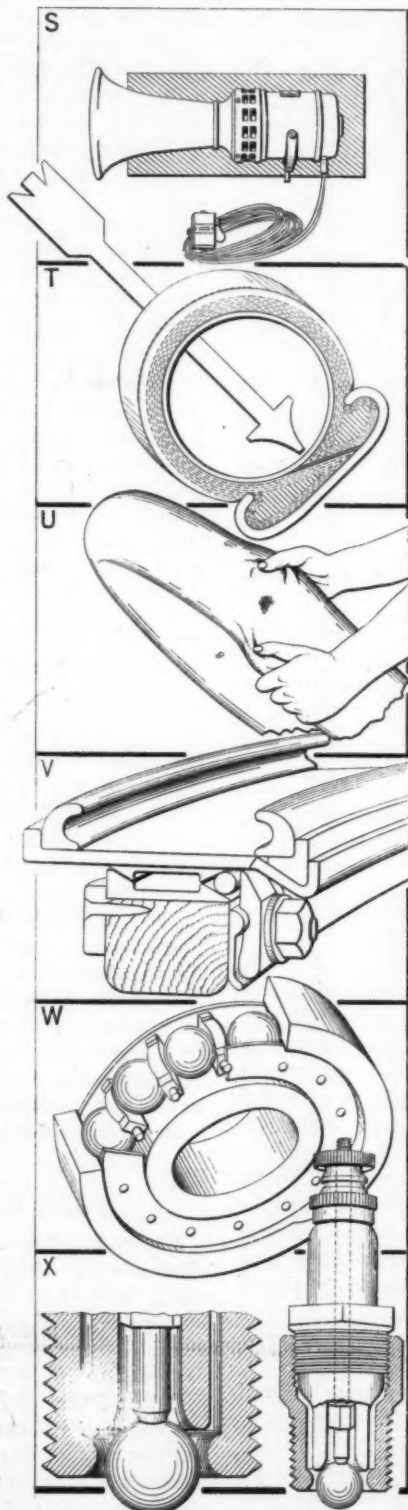
Seen in the Show Window

IN the SirenO (S), which is manufactured by the company of the same name, with offices at 1508 Taylor Building, New York City, the automobile public has a warning signal which, while powerful and far-reaching, in accord with the demands of present-day traffic conditions on street and road, is yet of a sufficient mellifluous and pleasing note as not to jar the sensibilities of the delicately nurtured. It may be had in eight styles and sizes, suitable for the smallest runabout or the largest touring car.

TIRES are conceded to be the most valuable portion of the make-up of the automobile. Tire trouble means time loss. Any device which will minimize these deficiencies should be welcomed. The Stein Laplock Tire (T), which is made by the Stein Double-Cushion Tire Company, of Akron, Ohio, has many points of excellence, which should recommend it to the motorist. Among them are the facts that the laplock scheme does away with the use of bolts or lugs, and that the solid base precludes pinching, chafing or rotting. The gain in durability and mileage, which is one advantage of a perfectly round inner tube, is apparent, besides which this tire is so made that all the air-space is beyond the line of the rim. Besides a distributing branch at 1864 Broadway, New York City, the company is represented by agents in all the larger cities of the country.

TO permanently repair a blow-out or puncture in the tube or casing of a tire in a quarter of an hour, without heating or vulcanizing, and at the cost of but ten cents, means progress. Yet that is the claim advanced for Tire-Doh (U), which has been placed upon the market by the Atlas Auto Supply Company, 26 East Adams street, Chicago, Ill. The process is simple: Clean around the puncture with gasoline, apply some of the cement, allowing it to dry 5 to 10 minutes, then knead a little of the "doh" into the hole and around the edges. The outfit consists of a can of the "doh," one of the cement and one inside casing patch for serious blow-outs.

MANY an automobilist who contemplates a different tire equipment for his car frequently abandons the idea when he finds that the tire which he prefers will not fit the rims. This difficulty seems to have been met by the Universal Rim (V), manufactured by the United Rim Company, of Akron, Ohio. This rim has been so named because it will fit all makes of tires, and carries with it the demonstrable feature in its simplest and best form. A



S—The Powerful "SirenO" Auto Signal

T—Boltless and Lugless Stein Laplock Tire

U—"Tire-Doh," a Handy Quick Repair Material

V—Universal Rim, Adapted to Any Make of Tire

W—The Schafer Anti-Friction Radial Ball Bearing

X—Ball Multi-Spark Plug, Claimed to be Sootless

car furnished with these rims may be shod with any of the well-known tires, without the extra expense and inconvenience of changing any part of the rim equipment.

EASE of running is a desideratum in the make-up of a car which is not lost sight of by either maker or purchaser. Ball bearings are a means to this end, and not a few American makers, after a thorough search for the best, have adopted the Schafer Radial Bearings (W), of which Barthel, Daly & Miller, 42 Broadway, New York City, are sole importers. The friction, with the use of these bearings, has been estimated to be less than one-eighth of one per cent. of the total load carried. Unlike plain journals, the friction at starting is no higher than when running. Each bearing is handled on a complete unit that never need be taken apart and whose parts mutually retain one another.

THE spark plug problem, which is now being given an unusual amount of scrutiny, is being solved by widely varying methods, and the Multi Type (X) is one which is attracting the notice of users, due to the form of the central electrode, which terminates in a sphere, and affords a plurality of paths for the spark, so that if carbon collects at some one point the spark diverts, finding a new path between cleaner surfaces, and it is claimed for this type of plug that it will not soot up. It is made by the Ball Multi-Spark Plug Company, 917 Hennepin avenue, Minneapolis, Minn.

MANY autoists prefer to spend their vacation up in the mountains, or at some point remote from the congested centers, and one way of accomplishing all there is to be had by way of enjoyment, and the recuperation of jaded nerves, is to take the automobile along and pitch the camp in the woods. A couple of portable buildings, one to serve as the habitation and the other as a garage, renders the camp immune from the ills of a week of rainy weather, affords a wind and weather-proof house to live in, and a locked-up place for the automobile against the machinations of the occasional rover, who, like the magpie, has a penchant for everything that shines, if it is not too heavy to give him a quota of labor in the process of carrying the booty away. The Springfield Portable House Company, 412 Allen street, Springfield, Mass., offers a wide variety of portable houses from which to select the types which will accord with the requirements of the respective adventurers. The portable building idea is not a great tax upon the pocketbook of the autoist.

SPECIAL NOTICES

Advertisements inserted under this heading at 20 cents per line; about 7 words make a line. Remittance should accompany copy. Replies forwarded if postage is furnished.

Cars for Sale

A BARGAIN—Must sacrifice my 1910 Simple runabout for cash; run 150 miles; guaranteed. Henry Christensen, Clifton, Ill.

A AMERICAN ROADSTER, price cheap, in A-1 condition; bargain for some one. Address G. J. V., Box 1312, Providence, R. I.

A NEW 1909 Palmer & Singer Landaulet, cost \$3,700; fully equipped; 30 horse; \$2,070 for quick sale. Sherwood, 186 William St., New York.

A NEW DEMOT CAR, the ideal runabout; top; wind shield; all accessories; cost over \$650; sell reasonable. Address, "Demonstration," care The Automobile.

A FEW BARGAINS left which we will close out immediately: 1909 Pope-Hartford; 1907 Pierce-Arrow 28-32; 1907 Oldsmobile; 1907 Winton touring car; 1906 Pierce-Arrow with delivery body; 1907 Mitchell runabout; also some seven-passenger cars, just the thing for livery. E. R. Thomas Motor Co., 1200 Niagara St., Buffalo, N. Y.

A PPERSON JACKRABBIT—55 h.p.; list price \$4,250; purchased April, 1908; driven less than 6,000 miles; absolutely A-1 condition excepting rear tires; four bucket seats with extra rumble seat. Great bargain for driver who wants car of unquestioned mechanical superiority, easy control and great speed. Can be seen at 248 Upper Mountain Ave., Upper Montclair, N. J. Will accept \$1,500 spot cash—no less. No agents. Address "A. H. Lamborn," 106 Wall St., New York.

A AUTOCAR, 5-passenger, 4-cylinder touring car; '07 model, new top, painting and overhauling; price \$750, or will exchange for smaller car, Stanley Steamer preferred. John Robinson, Mt. Sterling, Ky.

A AUTOMOBILE BARGAIN—Must sell at once, 4-cylinder, 5-passenger, 30-horsepower; like new; no dealers. Address P. O. Box 10, Lodi, N. J.

A AUTOMOBILE BUS—An excellent machine for hotel work or short hauls; seats 14 people; solid rubber tires; car new last July and is in perfect condition; \$1600 buys it or will trade for touring car. W. E. Barbour, Greensburg, Pa.

A AUTOMOBILE BARGAINS!! Special!—We recommend the following cars now on our sales floors and ready for immediate delivery as especially good opportunities for any buyer desiring to secure a fine high-grade used car of standard make at a strikingly low price. Peerless 1909 touring, Matheson 6-cyl. brand new, Pierce 6-cyl. touring, Packard 1908 close coupled, Oldsmobile 5 passenger, Chalmers 40 H. P. roadster, Buick type 10 double rumble, Regal touring, Autocar, Ford, Reo. Automobiles Bought, Sold and Exchanged. We are the largest dealers in the world—new and second-hand cars. No matter what car you are looking for we are sure to have it at the price you want to pay. Examine our large stock, over 300 cars to select from. Fine values at any price from \$150 up. Send for our Bargain Bulletin. All cars on our sales floors are in finest condition, guaranteed to be exactly as represented. Times Square Auto Co., 5 Big Houses, New York, 215-17 West 48th Street; Philadelphia, 288-40 N. Broad St.; Chicago, 1332-4 Michigan Ave.; St. Louis, Cor. Pine and 18th Sts.; Kansas City, 1701-3 Main St.

A AUTOMOBILES BOUGHT AND SOLD. Twentieth Century Automobile Co. 244-250 W. 49th St., New York.

A 7-PASSENGER Welch touring car, also one White Steamer runabout; both in perfect condition. Beckwith Bros., 119 Lafayette St., Schenectady, N. Y.

A 60-HORSEPOWER, 7-passenger Thomas touring car, 1908 model; fully equipped. Has just been overhauled and repainted. The New Departure Mfg. Co., Bristol, Conn.

A 1910 PALMER-SINGER, 6-60, 5-passenger, perfect shape; cost \$4,100; highest cash offer. A. L. Sheridan, La Fayette, Ind.

A 1909 BRUSH Runabout for sale. Fine condition. Run as a demonstrating car seven months. Fully equipped, top, lamps, etc. Reason for selling, must buy 1910 demonstrator. Andrew G. Orear, Room 9, Elvira Bldg., Columbia, Mo.

BUICK, 1909, toy tonneau, Model 10; top; perfect; no dealers. Dr. Boynton, Mt. Vernon, N. Y.

BUICK 1909, Model 10; toy tonneau, top, speedometer, extra tire, chains, etc.; run only 2100 miles; \$800 cash. W. L. Gray, care Garage, 360 Cumberland St., Brooklyn, N. Y.

CHEAP, 1904 Winton 2-cylinder, 24 H. P., roadster body, 32x4-in. wheels; needs but little repair; any reasonable offer above \$175.00 takes it. Cheap: 1 set solid tire wheels, 32-in. x 2½-in. tires, \$50.00; also 1 detachable tonneau body, all painted ready for upholstery, \$10.00; 1 set 28x3½-in. Goodrich casings, new, slightly shopworn, \$20.00 for the pair. E. E. Ritter, Milton, Pa.

DOLSON 40 H. P., five-passenger; just overhauled; sell or exchange for roadster. W. J. Weber, 12 Warren St., New York.

FIRST REASONABLE OFFER takes four-cylinder Peerless touring car; top and full equipment; 137-inch wheel base; just repainted and overhauled. G. H. Curtiss, Hammondsport, N. Y.

FIVE-PASSENGER 1907 Autocar, in good running order. Apply F. L. Tripp, Central Village, Mass.

FOR QUICK SALE—I offer at a low price my 5-passenger Stevens-Duryea touring car, fully equipped; looks and runs like new. Write me for photo and detailed description. M., 105 Chestnut St., Mt. Carmel, Ill.

FOR SALE—1909 6-cylinder Chadwick, rebuilt and painted; practically equal to new; low price. W. N. Wilbur, 237 N. Third St., Philadelphia, Pa.

FORD ROADSTER, top, lamps, etc.; rumble seat; perfect condition; \$425. 63 Willet St., Jamaica, L. I., N. Y.

GLIDE '08, 45-hp., 7-passenger. Guarantee perfect; thoroughly overhauled; fully equipped. Cost \$3,000. Take \$750. L. Cooke, 25 Broad St., N. Y.

HUPMOBILE 1910, perfect condition. Low price to quick buyer. Frederick Smith, 1777 Broadway, New York.

I HAVE A TOURING CAR which I wish to dispose of, and will sacrifice for \$450. Full description upon request. C. Franz, 615 West 115th St., New York City.

LOCOMOBILE Steam Runabout, good order. Price, \$90. Wm. D. Gould, Albany, N. Y.

MARTINI seven-passenger touring; cost \$8,400 to import; has traveled 11,000 miles; freshly overhauled; no dealers. Geo. Loomis, Long Island Automobile Club, Brooklyn, N. Y.

MAXWELL '08, 30-h.p. touring, newly painted, nicely equipped, going cheap for cash. Lewis Schantz, 10 Van Wagenen Ave., Jersey City, N. J.

MAXWELL SEATS, Double rumble or Surrey, for Model "Q".....\$45.00
Single Rumble22.50
Double Rumble, or Surrey, for Model "AA"35.00
Single Rumble30.00
Absolutely guaranteed to fit perfectly and to match finish and upholstery of car.
Complete line of automobile accessories and specialties. Gibbes Mach. Co. Columbia, S. C.

MITCHELL—4-Cyl., 35 H.P., four-passenger roadster; good as new; fully equipped; will sell for one-third cash; balance monthly; full information and photograph on request. Geo. L. Forrest, 88 LaSalle St., Chicago.

MORA 1910 TORPEDO—Specially constructed aluminum body; tufted upholstery; practically new; just limbered up. Finest equipment, including demountable rims, \$60 windshield, \$60 speedometer, Gabriel horn, Siren, mohair top, Prest-O-Lite tank, etc. Cost complete, \$3,100. To close estate, will consider reasonable offer. Address Box 6, care The Automobile.

MUST SELL my seven-passenger White Steamer; fully equipped and guaranteed to be in perfect condition; would trade for good real estate. What have you? 106 Bank St., Ishpeming, Mich.

MUST BE SOLD—Berg touring car; in first-class order. Jas. A. Whitchee, Essex Falls, N. J.

NEW 1910 FOUR-CYLINDER REO touring car for sale, \$1,150. Used only a short time as a demonstrator. Bright as new. In perfect condition. Not a scratch on it. Top, automatic windshield, Prest-O-Lite, trunk rack, tools and speedometer. This car is hardly worn smooth yet. Henley Eversole, Newman, Ill.

ONE 1909 STODDARD-DAYTON 45 H.P., with baby tonneau body; recently overhauled and newly painted. Car in excellent condition. Box 5012, care The Automobile.

ONE WHITE STEAMER, 4-passenger runabout, 1908 model; good as new. The New Departure Mfg. Co., Bristol, Conn.

ONE 1910 Model D Franklin, fully equipped; cost \$3,000; guaranteed by maker till 1911; run less than 800 miles; \$1,700. Apply to Edward A. Dauer, 167-9 Pine St., Providence, R. I.

PEERLESS 5-passenger, excellent condition; equipped with Firestone demountable rims, two extra rims, two extra casings never used, three new tubes, Klaxon horn, electric light, gas tank, speedometer, Elsmann magneto battery, mohair leather bound seat covers and dust hood; an elegant car; any one purchasing it will be highly pleased; any judge of automobile values will say it is worth the money—\$1,500. Can be seen at garage, 5461 Lake Ave., Chicago. C. J. Prentiss.

PENNSYLVANIA, 1910, Toy Tonneau, fully equipped, Quimby body, perfect condition; cost, \$2,700; sell for \$1,750 net. Carl Helmetag, 1011 Chestnut St., Philadelphia, Pa.

PIERCE-ARROW "Big Six" 65 h.p., '08, 7-passenger, fully equipped, top, glass front, Gabriel horn, Warner clock and speedometer, Prest-O-Lite tank, air tank, extra tires and tubes, seat covers, and traveling bag; a bargain at \$2750. Jas. F. Patton, 4609 Euclid Ave., Cleveland, O.

POPE-TOLEDO, 4-cylinder large car, complete, in first-class shape; all extras; price, \$700; will exchange. L. M. Barnes, 131 Main St., New Britain, Conn.

PREMIER THIRTY, Five-passenger touring car; top, windshield, Warner Speedometer; Prest-O-Lite tank, two extra casings; run only 6,000 miles, perfect condition; cash price, \$1250. C. L. Woodbury, Burlington, Vt.

PRIVATE GENTLEMAN will sell reasonably 50-h.p. Roadster; good as new; new speedometer, cost \$60; two tires, 34 x 4 tubes. Box 1513, care The Automobile.

RAMBLER, 22-horsepower, 5-passenger touring car, in fine running order. G. H. Wagner, Hastings-on-Hudson, N. Y.

REAL AUTOMOBILE VALUES—As selling prices depend upon expenses, we are in a position to offer the greatest value in New York; two blocks from Broadway means \$30,000 annually saved in rent. Another strong feature is that we sell direct for owners, charging them 5 per cent. commission. This saves you the liberal profit demanded by dealers. Over 250 slightly used automobiles to select from. Prices \$150 to \$4,000. Nearly every make represented in the great stock here. Call or send for weekly bargain list. Manhattan Storage Co., 334-340 West 44th st., New York City.

REBUILT AMERICAN 3-ton truck, new Hartford tires; will do the work of a new one; bargain. Address "Rare Chance," care The Automobile.

REO, two-cylinder cars, all styles, all models, all prices; overhauled, repainted; strictly up to date; one of our specialties. C. & G. Auto Company, 62 West 43d St., New York.

RUNABOUT, fully overhauled; seats two or four; rare bargain, \$150; one four-cyl. Ford runabout, \$250; one single-cylinder buggy, \$150; one two-cylinder Queens, \$200; one four-cylinder Haynes, \$700. F. J. English, Garage, 60th St. and New Utrecht Ave., Brooklyn, N. Y.

SEVEN-PASSENGER body, good condition with five-bow folding top; never been folded; with curtains never used. Ask for description and price. G. F. Ellis, Macon, Ga.

Please mention The Automobile when writing to Advertisers

SEVEN-SEATED Stoddard-Dayton. Condition like new. J. F. Kellogg, Avon, N. Y.

STANLEY Model EX Car, first-class condition; new boilers, tires OK.; low price. Inquire O. & S. Mfg. Co., West Main St., Plainville, Conn.

TWO new modern thirty-passenger electric sightseeing cars with terraced seats and canopy top. Low price to quick buyer. Address "Electri," care The Automobile.

ROMAN AUTOMOBILE CO.

1740-42 Market St., Philadelphia, Pa.
1315 H. St., N. W., Washington, D. C.
High-grade, late model cars at remarkably low prices.

Specials at Philadelphia:

1910 Marion Roadster, very speedy.
1910 Buick Touring, brand new.
1909 Premier "40" Touring, like new.
1909 Mitchell "40" Touring, 7-passenger.
1909 Maxwell "30" Touring.
1909 Cadillac and Chalmers Roadsters.
1909 Baker Electric.

Washington Specials:

1910 Ford Roadster, double rumble seat. Oldsmobile Touring, like new.
1908 Pope Toledo Touring, fine shape. Cadillac Touring, fine condition.
Buick, Maxwell and Ford Runabouts, late models, \$250 up.
150 others from \$75 to \$3,000.
Call or write for Bargain Sheets.

USED CAR BARGAINS.

Among others we offer the following rare opportunities in standard makes of cars overhauled, remodeled, refinished and brought up to date.

Overland 1909, six-cyl. baby tonneau	\$1,200
Thomas 1907 "60," seven-passenger..	1,200
Oldsmobile 1907 "40," double rumble roadster	850
De Dietrich 1906 "24," five-passenger or would make fine commercial car	850
Haynes 1908 "40," chassis, complete	750
Dolson 1907 "35," five-passenger.....	550
Reo 1909, "22" roadster, four-passenger	575
Reo 1909, "10" runabout, two, four..	325
Reo 1907, "22" five-passenger.....	450
Reo 1906, "22" five-passenger.....	350

Used Car Department.
C. & G. Auto Company, Inc., 62 West 43d St., New York City, N. Y.

WANT TO BUY, SELL or exchange a car?
The C. & G. Auto Company, of New York City, for yours! Look 'em up.

WAVERLY Electric Coupé, run two years; recently overhauled; new batteries; tires in good condition; original cost \$2,100. Will sell for \$650 cash. G. S. Elton, 121 So. 7th St., Terre Haute, Ind.

WHITE STEAMER, 1906, five passenger, full equipment, excellent condition, many extras, tires good, \$575. Demonstration and instruction by owner, 1675 50th St., Brooklyn, N. Y.

\$250 WILL buy French runabout, guaranteed to be in perfect condition. Geo. W. Mathison, 256 E. Madison St., Chicago, Ill.

\$1200—Must sell my \$4200 full seven-passenger Model G White Steamer, with Model K improvements; complete equipment and in perfect condition; top, curtains, dust cape, brass-mounted folding windshield, Warner speedometer, clock, five lamps and Presto tank, shock absorbers, trunk and carrier, extra rear shoe, case and rack, four extra inner tubes, extra pilot light, vaporizer and tools. Ready to go anywhere as is. This is a genuine bargain. Will send photo on request. Money refunded if not as represented. H. W. Shonnard, 17 Washington St., East Orange, N. J.

1908 MITCHELL Runabout, first-class order; good tires; \$600. "C. K.," care The Automobile.

1908 —5-PASSENGER American \$4,000 car for \$1,000; '09 Model F 30 Chalmers-Detroit, double rumble roadster, \$300 extras, \$1,050. W. M. Lee, Athol, Mass.

1909 CHALMERS 30 Roadster, used but little, in fine condition. Cost, with equipment, \$1,800. Price, \$1,100. "M. M.," care The Automobile.

1910 WHITE gasoline automobile, in fine condition. Hanswirth, 164 Main St., East Orange, N. J.

1910 CHALMERS "30," Model "K," 4-cylinder touring car for sale; top, windshield and full equipment of best grade; Warner autometer, 2 new extra casings; color blue; run 1,100 miles; perfect condition; tires, 2 good, 2 fair; only reason for selling, have purchased Chalmers "40." Price \$1,200. Photo and particulars or demonstration. J. Lonergan, 806 Chestnut St., St. Louis, Mo.

1910 SIX-CYLINDER, 60-h.p. Premier, 7-passenger touring car; run only 1,000 miles; completely equipped and in perfect condition; cost \$3,750; will accept first check for \$2,500. Chicago Motor Car Co., Michigan Ave. & 24th St., Chicago, Ill.

Cars Wanted

A RUNABOUT machine wanted by an architect and builder, in exchange for services in either line. "Builder," Room 30, 118 Market St., Newark, N. J.

AUTOMOBILES that have been damaged or wrecked will be purchased by me. Gilmer, 146 West 56th St., New York City.

DESIRABLE free and clear Jersey lots to exchange for high-grade five or seven-passenger touring car; prime condition. Room 1756, 50 Church St., New York City.

EXCHANGE a farm near market for five-passenger automobile of late model; remainder on easy terms if desired. Write for particulars. B. G. Palmer, Medway, N. Y.

FOR EXCHANGE—Will exchange U. S. Patent for automobile. Inventor has not funds to have same manufactured. If interested, address D. W. Cherry, Donalsonville, Ga.

FOR SALE or exchange for automobile, tension device for wool dresser spools, patented. 6 Fairview St., Keene, N. H.

FOR TRADE—Stock in the Colorado Industrial Exposition Association for automobile; roadster preferred. Address Box 227, Denver, Colo.

FOR UP-TO-DATE, good order touring car I will give 20,000 shares non-assessable gold mining stock that is liable to be worth within 18 months \$1.00 per share. C. J. Greene, Nowata, Okla.

I HAVE good paying real estate in Newark and suburbs; will exchange for good make automobiles not older than 1907. Particulars, Post Office Box 441, Newark, N. J.

I WILL GIVE lot of land, 5c. fare, or house in Winthrop, for touring car. S. A. Cash, 1462 Washington St., Boston, Mass.

I WANT good touring car, carry my family of seven; will exchange my interest in real estate in Boston, valued \$3,500; pays me 10 per cent. A. T. Gibson, 35 Court St., Boston, Mass.

SECOND-HAND AUTOMOBILE wanted; will exchange \$1,000 interest prosperous wholesale business on State St. Geo. G. Power, 252 Dudley St., Roxbury, Mass.

TWO free and clear Jersey lots worth \$350 for runabout. Will add cash. Box 5015, care The Automobile.

WANT—Station wagon (gasoline) in trade for fine building lot. Address "Hord," 334 5th Ave., New York.

WANTED—1909 or 1910 Packard, fully equipped. Box 5002, care The Automobile.

WILL consider a high-grade automobile on excellent quarter of Kansas land. John Brown, 628 New York Life Bldg., Kansas City, Mo.

\$200 CASH and rich looking two-cylinder Rambler touring for good four-cylinder, late model. Address "P. S.," care The Automobile.

Parts and Accessories

FOR SALE

BUICK MODEL NO. 10 OWNERS—If you would have better control, write for circular descriptive of the F.-B. Automatic

Clutch Releaser. Engine brake and low speed pedals throw out the high. The F.-B. Company, 1211 Lady St., Columbia, S. C.

BUICK—F. B. Hoadley, Waterbury, Conn., makes a tool designed especially and guaranteed to easily remove key holding valve stem, in Buick autos. Price \$2.00 prepaid.

DO YOU WANT to remodel the appearance of your car? State model and proposed change. Ask for catalogue S of seats, bodies, fenders, etc. A. R. Co., 1307 Wabash Ave., Chicago, Ill.

DRAGON REPAIR PARTS—We manufacture and keep on hand all repair parts for Dragon cars. We make a specialty of repairing this machine. Philadelphia Machine Works, 67 Laurel St., Philadelphia, Pa.

EXCEPTIONAL BARGAINS—Locking steering gears, 16-inch wheel, control on top, \$10. Rack and pinion gears, \$8. Steering wheels, 16 inches diameter, \$2.50; 18 inches, \$3; 14 inches, \$2. Ball bearing front axles, \$10 each. Chain drive axle, 30-tooth sprocket, \$25; 52-tooth sprocket, \$2.50; brake drum to fit, \$3. Brass bound windshield, \$17; wood shield, brass bound, \$9. Brass hood radiators, \$23. Folding hoods, 27½ inches long, with vents, \$3; 42 inches long, \$7. Fawn River magneto, with coil, \$30. 2-cyl. A. C. 4x4 opposed motor mechanical valves, \$62; type N, \$58; trans. for same, \$15. 3-cyl. A. C. 9-h.p. Continental motor, \$80. 4-cyl. 4½ A. C., \$100. 14-h.p. A. C. motor, with 4-feed oiler, timer and carb., \$95. 5x5½ 2-cyl. A. C. upright, \$70. 2-h.p. marine 2-cyl. motor, \$28. 3-speed sliding gear, chain-drive trans., 25-h.p., \$20. 1-cyl. Olds 10-h.p., \$40; 5x5 opposed W. C., \$60; 4½x5, \$45; 5½x4½, \$41 condition, \$90. New 5x4, 4½x5 A. C. opposed, \$90. Cadillac motor and trans., \$42. Air cooled fronts, \$7; with 42-inch hood, \$12. Thomas chain-drive trans. and levers, \$60. Orient rear axles, \$7. 5-pass. body, 33½x84, \$70. Fenders, with skirts for large car, \$8; for small car, with mud aprons, \$10 per set. 28x3 clincher wheels, \$11 per set; 30x3, \$14; 34x3½, \$18; 34x4½, \$18. 26x4 Goodyear rims, \$22. 28x2½ wheels, single-tube rim, \$8 per set. Buggy bodies, 33x68 inches, \$7. Front axle yokes and knuckles, some machined, \$1 each. 32x3 wheels, single-tube tires, \$30. Adjustable spring blocks, 3-inch axle, 2-inch spring, \$2. 1-inch Buffalo carb., \$3.50. Pressed steel frames, 33½x123 inches, with subframe, \$15; unassembled, 34x135, \$12. 4 inches deep, 144 inches long offset frames, \$15. Monarch frames, assembled, 11 feet 8 inches, \$20. Upholstered seats, 43 inches wide, \$12. 6-gal. gasoline tanks, 50c each. 25-h.p. new Warner differential gears, \$12; drive gears to fit, per set, \$12. 100 truck hubs, suitable for 2 to 5-ton trucks, \$4 to \$8 each. 34 4½ clincher rims, \$1 each. ½ elliptic springs, 2½x45x7 leaf, \$2.50; nearly all other sizes, 33 4½x5½ British-Am. 4-cyl. motors, oiler, timer and pump, \$300. 30 sets of Timken axles, \$150 per set. 20 40-h.p. Honeycomb radiators, with hoods, \$40. 75 mahogany dashes, \$3. High wheels, buggies complete, \$350. Write before buying elsewhere. Get our No. 80 bargain sheet. We can save you money. Auto Parts Co., 517 W. Jackson Blvd., Chicago.

FOR SALE—Bodies made for Rider-Lewis 1910 cars; trimmed; some painted. R. J. Irvin Mfg. Co., Indianapolis, Ind.

FOR SALE—No. 10 Lingle power hammer, used less than 10 days, good as new; will sell cheap. If interested, send for complete information. Milton Mfg. Co., Milton, Pa.

FORD "T" OWNERS, get our catalogue of specialties for your car. It means \$\$\$\$ for you. Oil gauges, electric light outfits, elevated timer attachments. Send dealer's name. Auto Parts Co., Providence, R. I.

FIVE REAR axles and transmissions a unit, will carry up to 25 horsepower; never been used and of this year's make. Vanderwater & Co., Elizabeth, N. J.

INCREASE the power of your engine and make it run like a six. The mixer will do it. Only \$1.00 prepaid. Money refunded if not as represented. H. L. Noll, Lancaster, O.

LATHE and 7-horsepower gasoline engine, both in first-class condition. Will sell either or both very cheap. Kearney Auto Co., Kearney, Neb.

MONOPLEX ELECTRIC HORN, new, \$10; Stromberg 1-inch Carburetor, \$10; Schebler 1-inch, \$6.00. Address "B. B.," care The Automobile.

Please mention The Automobile when writing to Advertisers.

ONE SECOND-HAND AUTOCAR body, detachable tonneau; one new Zimmerman four-cylinder timer; one new 1-8 Roberts Sight feed lubricator for steam engine.—J. E. Morton, Palmyra, N. J.

RADIATORS, hoods, mudguards, metal dishes, gasoline and water tanks. If building or remodeling a car, it will pay you to write us, as we lead in this line. Auto Sheet Metal Works, 2230 Michigan Ave., Chicago, Ill.

TOPS—Until further notice, runabout tops, \$20; touring car tops, \$35. C. G. Meyer & Son, Tiffin, Ohio.

TRY CRAIG'S MUFFLER BLACK; will not burn off or scale. Craig, Bridesburg, Pa.

TWO NEW 150-gal. Bowser Gasoline Tanks. Apply Chicago Telephone Co., care I. W. Hull, 1521 W. Harrison St., Chicago, Ill.

45-H. P., 4-cylinder, water-cooled engine complete, \$325. Pressed steel frame, \$22.50. Complete set front and rear shaft drive axles, hubs, bearings, etc., \$110. Front axles, complete, bearings, hubs, steering knuckles, rods, \$22.50. McCord force-feed, 4-feed oiler, \$12. 4-cylinder Autocoll, \$12. New radiators and hoods, 22-25 H. P., \$22.50. Automobile Appliance Co., 1714 Michigan Ave., Chicago, Ill.

\$75 TAKES Chalmers tourabout body complete, with top; like new. 300 W. 69th St., Chicago, Ill. Phone Went, 616.

Parts and Accessories

WANTED

WANTED—Tonneau for '09 Reo; must be in good condition; state price. Reo Garage Co., Albia, Ia.

WANTED—Name and address of company that can produce gasoline motors in lots of one to five hundred. Motors to be built according to plans and specifications furnished by buyer. Workmanship must be of a high degree of excellence. One thousand motors a year needed but have capacity at present for only five hundred. No concern without experience in this line need answer this ad. Apply to Charles Kemke, 2206 Fifth Ave., New York City.

WANTED—Set quick detachable rims, 34 x 4½. Name price and make. P. O. Box 283, Wilkesbarre, Pa.

WANTED—A well-designed chassis including axles, transmission, frame, etc. (without engine) suitable for testing out a 25 horse power experimental motor. Address Box 3 care The Automobile.

Situations Wanted

AMERICAN, expert automobilist, 10 years' varied agency experience, speaks French and German, wants position with reliable concern desiring European business, or will act as courier chauffeur. C. S. Johnston, 37 Ave. Marceau, Paris, France.

BUYER OR ASSISTANT, for shop supplies, machinery, etc. Details at interview. Address "Buyer," care The Automobile.

CHAUFFEUR—Situation wanted by a colored man in private family; write or call. Eric Jenkins, 1561 Gratiot St., St. Louis, Mo.

CHIEF engineer open for engagement. University graduate, 10 years' experience designing and constructing. Expert in pleasure and commercial cars, taxicabs, racers, etc. Dead sure success. Address G. B. L., care The Automobile.

COMMERCIAL CAR BUILDERS—Can you use the services of a first-class man who knows thoroughly the sales end of the Commercial Car Business? If interested, address "Commercial," care The Automobile.

EXPERIENCED chauffeur wants position; can do work on any gasoline car; can furnish reference. Address Jones Anderson, Canonsburg, Pa.

SITUATION WANTED—Licensed chauffeur wishes position; can operate and repair any gasoline car; sober and reliable; references. James E. Griswold, Chana, Ill.

WANTED—Position as foreman in trimming department of automobile or carriage company; 10 years' experience. Address Box 7, care The Automobile.

YOUNG MAN, at present manager retail automobile concern, would like a position in factory sales department; 5 years' experience; best references. Address Box 497, care The Automobile.

Help Wanted

AGENT WANTED—Calling on auto supply houses, garages and owners, to represent a manufacturer of a successful specialty. Liberal commission contract. Address Box 2, care The Automobile.

GENERAL foreman wanted for our Automobile Department to take charge of assembling, testing, inspecting and experimental automobile work. Only experienced men, thoroughly familiar with high-class work of this nature, need apply. Applicants must state clearly experience, former employers, references, age and full qualifications. H. H. Babcock Co., Watertown, N. Y.

SELLING ABILITY—If you have demonstrated ability to sell automobiles ranging in price from \$900 to \$2,000 and have had at least two years' experience in this work, there is an opportunity for you to become connected with a large Detroit Motor Car Manufacturer who is looking for just these kind of men. There are two chances for two good men. Only applications from experienced men will be considered. All replies considered strictly confidential. Address "Box 4," The Automobile.

WANTED—First-class mechanic and trouble finder. Experienced in all kinds of automobiles. Permanent position for right man. Apply Benson's Garage, 357 No. Craig St., Pittsburgh, Pa.

WANTED—Commission salesman, calling on automobile accessories trade, to handle a high grade specialty as a side line; liberal proposition. Address Box 5, care The Automobile.

WANTED—We want to establish American agencies for Hotchkiss automobiles in large territories. Representatives must have wide experience and A-1 standing. Direct replies to Hotchkiss Import Company, 20 West 60th St., New York City.

WANTED—Salesmen, high-class, to sell "Sta-Rite" Ignition plugs. Leaders for eight years. The R. E. Hardy Co., 1735 Michigan Ave., Chicago.

Insurance

TIRE, THEFT, liability, collision, accident, property damaged and transportation fully covered; lowest rate. Colman Company, 165 Broadway, New York. Phone, Cortlandt 2409.

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ALUMINUM, cast-iron, steel welded and amalgamated to perfection; nothing too difficult; no soldering, patching or warping; gear cases and cylinders a specialty; only practical process; work guaranteed. "Futterman's Welding System," 798 10th Ave., N. Y.

ARE YOU disgusted with welding? If so, send to us your broken cylinders, motor-casing, gear boxes, crankshafts, etc. We repair any metal, regardless of shape or form—like new. Our reputation is your guarantee. Guarantee Welding Works, 355-59 West 42d St., New York.

EXHAUSTED dry batteries can be renewed for one cent each; sample scientific instructions, 25 cents; satisfaction guaranteed. Dirigo Company, Bath, Me.

MAGNETOS—Bought, sold, exchanged, repaired, rebuilt, rewound and remagnetized; spark coils repaired and for sale; platinum points for all makes of magnetos and coils; send for bargain lists. Robinson-Dubuc, 1777 Broadway, New York, Rooms 229-231.

SEND US BROKEN CYLINDERS, crank-cases, etc., to be repaired by autogenous welding. Quicker and much cheaper than ordering replacement parts. No charge unless weld is successful. Estimates and references given. Remember we repair any broken metal parts without solder, pressure or brazing. Try us. Waterbury Welding Company, Waterbury, Conn.

TIRES REPAIRED—Automobile owners, do you want your tires repaired or re-covered by the people who know how? Give us a trial and be convinced. Inner tubes vulcanized at short notice. Jungkind & Vogler, 158 Chambers St., New York City. Telephone, 3386 Cortlandt.

Auto Schools

AUTOMOBILE INSTRUCTION, individual road work and small group classes. Day and evening. Arrangements for out-of-town men. Booklet on request. West Side Y. M. C. A. Automobile School, 310 West 57th St., New York City. Tel. 3800 Columbus.

OLDEST SCHOOL, twice the number of hours of instruction for less money than other schools; most practical instructors. Endorsed by auto trade. Catalogues sent on request. New York School of Automobile Engineers, Inc., 148 West 56th St., New York.

STEWART AUTOMOBILE SCHOOL. Best equipped instruction plant in U. S. Thorough individual mechanical and driving courses. Only up-to-date cars used. Arrangements made for out-of-town students. Special courses for ladies. Send for booklet "A." The Stewart Automobile Academy, 231 West 54th St., New York City.

For Sale or For Rent

FOR SALE—Modern manufacturing plant 55 miles from New York City, with excellent railroad facilities and large frontage on the Hudson River. For particulars address Dahl, 78 Wall St., New York City.

I HAVE a plant suitable for the manufacture of automobile or other purposes, with 45,000 ft. of floor space. Steam heated; electric power can be used. Large grounds on main line of Wabash R. R., an ideal factory site. Description and photograph will be furnished on application. This plant and grounds will be given to good parties with capital and an assured business. We may add cost of moving. No publicity given any correspondence. J. M. Harter, Wabash, Ind.

SOLID brick block, worth \$6,000, used for machine shop and foundry, with 1,500 worth of machinery and tools; will sell the whole thing for \$3,500, on terms. Shops would make a fine garage; a splendid territory to sell rebuilt autos. For further particulars address H. P. Madson, New London, Wis.

Business Opportunities

HAVE patent on wind shield that houses in dash; superb feature for intending manufacturer of cars with chassis not yet decided upon; sale or royalty. Qui Vive, care The Automobile.

MANUFACTURERS—ATTENTION—Start-er successfully in use on motor car; automatic action; operated by foot lever; applicable to any gas engine for automobile, motor boat or stationary work; compact; demonstration given to interested manufacturers. Licenses issued on responsible terms. J. W. Tudor, 35 Congress St., Boston, Mass.

PATENT FOR SALE—Portable ignition trouble finder, cheap to manufacture. Every automobile will have one. Fully covered by U. S. patent. Box 210, care The Automobile.

(Special Notices continued on page 62.)

HUDSON AN

The Hudson Motor Car Co. has been an entirely separate organization since January 1, 1910, complete in itself and allied with no other concern. From the beginning, the controlling interests has been held by the present officers. Our production plans comprise the closing of this season in the Fall. We are now supplying our dealers at the rate of 800 cars per month; many of our agency contracts are now expiring, and we are ready to talk business on certain territory in various sections of the country, possibly yours, which we have open, including two or three of the larger cities where we desire exclusive representation. Contracts have already been closed, with deposits, for over 46,000 cars. Application to our sales department can be made by letter, wire or "phone," and will be filed and handled in order received. If your territory is closed, we will give you immediate notice; we suggest that you use night lettergram giving full information. The new half million dollar Hudson factory is well under way and will be one of the finest automobile plants in the country when finished in October. The personnel of the Hudson Motor Car Company insures every season well-built, well-finished cars and prompt shipment. Mr. H. E. Coffin, one of the most famous

ANNOUNCEMENT

of America's designers, and President of the Society of Automobile Engineers, is Vice-president of the Hudson Motor Car Company, and at the head of our engineering department. He is devoting his time exclusively to the Hudson line.

THE OFFICIALS OF THE HUDSON MOTOR CAR COMPANY ARE:

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DETROIT, MICH., U. S. A.

Licensed under the Selden Patent

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(Continued from page 59.)

Motor Boats, Etc.

FINE AUXILIARY Down East Catboat, 5 h. p. Bridgeport motor, bargain. P. O. Box 776, New Haven, Conn.

FOR SALE—25-foot Catboat with 8 h.p. engine; 2 years old. Herbert Bassett, Chathamport, Mass.

FOR SALE AT \$1,200, or exchange for Renault car, cabin launch, 39 ft. long, 10 ft. beam, twin propellers; full inventory; ready for cruising; cost \$3,000. Address Nock Auto Co., Providence, R. I.

FOR SALE OR EXCHANGE—Speed boat (21 miles) 27 ft. 6 in. by 4 ft. 2 in. beams; 16-20 h.p. Rochester engine; reverse gears; mahogany streak deck and combing spray head; cost over \$1650; like new; perfect condition every way; sell at bargain or trade for good raceboat or runabout car. P. O. Box 1487, Lee, Mass.

29x8 GLASS CABIN, 11 horse engine and clutch; all new; cheap; can be seen at Hegaman's Dock, Fort Hamilton, E. Bell, 9214 3d Ave., Brooklyn, N. Y.

50-FT. RAISED DECK CRUISER for sale or to charter. Particulars, address P. Klein, 260 First Ave., Mount Vernon, N. Y.

Motor Cycles, Etc.

FOR SALE—Reading Standard, twin cylinder motorcycle. 335 North St., Rochester, N. Y. Will ship C.O.D. anywhere.

WILL EXCHANGE a complete electrical engineering course in I. C. S. for an up-to-date motorcycle. Address "Engineer," 76 Westland Ave., Roxbury, Mass.

Miscellaneous

AUTOMOBILES can find (dead) storage in clean building (124 East 13th St.), at \$5 to \$10 per month, according to size. Van Tassel & Kearney, 130 East 13th St., New York.

DOES your gasoline motor run smoothly? If not, send 10c. postage for 56-page textbook on "Carburetors and Engine Troubles." Breeze Carburetor Co., Newark, N. J.

IF YOUR GASOLINE MOTOR does not run smoothly, send 10 cents postage for 56-page text book on "Engine Troubles." Gives remedies for every motor trouble. Breeze Carburetors, Newark, N. J.

GUN METAL YOUR BRASS—Arsenal Liquid Gun Metal is easily applied and makes a lasting gun metal enamel on brass. Can be removed at any time without injury to lamps or radiators. The only article of proven merit of its kind. If not at your dealer's, we will forward a can prepaid on receipt of \$1.00. Arsenal Varnish Co., Rock Island, Ill. (Motor Car Dept.)

METALLIC RAILROAD tie rail fastener and splice bar for sale, or trade for a good automobile and part cash. H. C. Stickel, P. O. Box 111, Star Junction, Pa.

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If you are interested and will write the box number given below, we will take the matter up with you in detail. This notice will appear only twice.

Address Box 5050, care The Automobile

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Three Sixteen-Passenger Grabowsky Sight-Seeing Cars, Covered. Cars used four months. Have just been completely overhauled and put in first class condition. New 45 horse power engine, new transmissions, new differential, and new rear tires installed on each car, making practically new cars. Will sell at reasonable price for cash. Address

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

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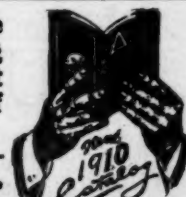
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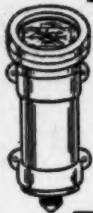
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TIRE VALVE REPAIRER 25 cents each

Drop Forged
One Piece
Repairs
Inside or
Outside



Removes
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In a few
Seconds—
Saves Valves

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Red Head
SPARK PLUG
LAUGHS AT THE HEAT

All Sizes. All Styles. Porcelain or Metal. \$1.00



HIGH-GRADE Pressure Gages

FOR
Gasoline, Air, Water or Steam
also
Pop Valves, Water Gages and Cocks
THE ADJUST VALVE CO., 271 Franklin St., Boston, Mass.

**SCRAP
LEATHER
WANTED**

Send
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Dayton Airless Tire

Would our big plant's capacity be taxed to
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ing other than giving satisfaction in overflow-
ing measure to thousands of users who for-
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the literature, and let the nearest Dayton dealer
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PATTERSON BATTERY SYSTEM

The IDEAL for Motor Car
Ignition!

SEND FOR BULLETIN 62

STANLEY & PATTERSON
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ESTABLISHED 1884.
**SCHRADER
UNIVERSAL VALVES**
TRADE MARK REGISTERED APRIL 30, 1893.

The Standard American Valves for
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Manufactured by
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Bay State Autokit
No. 1—\$10

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\$3

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Swirlaction
The Life Saving Bumper



METAL POLISH

Highest Award
Chicago World's Fair, 1893;
Louisiana Purchase Exposition,
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3-oz. Box for 10 cents
Sold by Agents and Dealers
all over the world. Ask or
write for free samples.
5-lb. Pails, \$1.00
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Expert Polish Maker
Indianapolis, Indiana
Sold by Dealers
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MAILED YOU
DAILY, WEEKLY, QUARTERLY
Special Alphabetical Lists for Cities and Towns
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CHARGE your ignition battery
at home from an alter-
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SIMPLICITY RECTIFIER

Cheap, durable and efficient; saves
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No more hard rubbing,
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Voltmeters—Ammeters—
Volt-Ammeters
Coil Current Indicators
Watch type, light weight.
Designed for accurate testing.
Durable and convenient.
In Morocco case for carrying.
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See Our Advertisement on Page H-6

In Issue of THE AUTOMOBILE
Dec. 30, 1909

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WORKS Penacook, N. H.

Cadillac "Thirty"
\$1600.00

The car that established a new
standard in Automobile
Values

Cadillac Motor Car Co., Detroit, Mich.

Pure PS&CO Red
SEAMLESS
INNER TUBES
NOT THE CHEAPEST
BUT THE BEST TUBE MADE
MADE IN AMERICA

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Parts of all descriptions

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STANDARD BEARINGS STAND THE TEST

BECAUSE THEY RUN BETTER
WEAR BETTER AND ARE
BETTER IN EVERY RESPECT.

STANDARD ROLLER BEARING COMPANY
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AUTO-TOP FABRICS OF EVERY DESCRIPTION

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and Differentials in stock and
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PRESSED STEEL

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Automobile Wheels and Axles

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The GRAMM MOTOR CAR CO.

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Write for Circular describing our
several models



200 cars to select from.
We are also agents for 18 makes of new cars, and can take your machine in partial payment.
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We have
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3,000
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that a high
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car, thor-
oughly re-
built as we
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a cheap new
car at the
same price.

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Automobile Gears

Mechanically perfect
Prompt deliveries

If in a hurry, wire us

R. D. NUTTALL COMPANY
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Did you ever notice the difference in the burning
qualities of a lamp? There is a big difference;
just watch the Autos as they pass: if the wind is
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the flame is cut way down, some of them so bad
that you can hardly see the light.

Not so with HAM'S; they are built on the
"COLD BLAST" principle, which means perfect
combustion. The draughts are so arranged that
the flame is not affected by strong wind or fast
driving; therefore you always have a big, steady,
white light that will not blow or jar out.

If you want lamps that are built to burn and give service,
and have that rich quality effect, let us send you one of
our catalogues. Address, Dept. "B."

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Continental Quick Detachable Tires

NOW READY FOR DELIVERY

Inquire of your nearest dealer

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Spark Plug Baffles the Soot. Mica or
Porcelain \$1.00. At dealers or postpaid.

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SPICER MANUFACTURING CO.

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Halladay

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A Real Automobile FOR \$1,000

Model 38 of the Overland—with 25 horsepower and a 102-inch wheel base—sells for \$1,000, lamps and magneto included. It is a better car than the \$1,250 Overland last year. Our contracts from dealers call for 12,000 cars of Model 38 alone. We are turning out 80 per day. Because of this output we are giving more for the money than any other car ever gave.

Write for our catalog G-3; also for a copy of "The Wonderful Overland Story."

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Franklin Automobiles

Franklin air cooling, Franklin light weight, Franklin resiliency, Franklin tire equipment unite in producing automobile results which today the exacting buyer demands.

H. H. FRANKLIN MANUFACTURING COMPANY
SYRACUSE, N. Y.
Licensed under Selden Patent

THE MAYTAG Formerly THE MASON

Climbs the hills the other fellows go 'round and plows through roads of snow, mud and sand that are entirely out of the question for other cars to travel. Maytags are distinguished not only for great power, but ease of control, easy riding qualities and low cost of up-keep.

Complete Line—Six Models

Maytags offer the widest choice in style, power and price. No matter what type of car you have in mind don't decide until you know the Maytag. The Best Proposition of 1910 For Dealers.



Write for Catalog Now.

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"The Easiest Riding Car in The World"

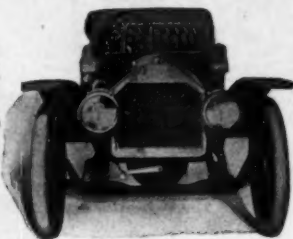


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Pilot



4 Cyl. 35 H.P. Fully Equipped

TOURING CAR - \$2,250

ROADSTER - 2,000

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Austin

SIX CYLINDER CARS

Model 45 **Model 50** **Model 60**
45-60 H. P., \$3000 50-70 H. P., \$4500 80-90 H. P., \$8000

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"30" Shaft Drive "40" Chain Drive

The Locomobile Co. of America

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Licensed under the Selden Patent

"The 1911" Owen

Progressive dealers wanted in open territory. Get the benefit of our demonstrators who have started out to cover the country. Write to-day

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The Gabriel Horn is operated by a foot pedal, your hands never leave the steering wheel.

Its full rich notes can be heard for blocks on a busy street and for miles on a country road. It warns effectively without frightening.

THE GABRIEL TRUMPET HORN is the ideal horn for touring. Its Bugle calls echoing along country roads revive memories of the good old coaching days.

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suitable for use in connection with Automobile Garages, Pneumatic Water Plants, Gas Engine Starting Outfits, or anything of that nature. Can be provided in the most simple and satisfactory manner by the user of one of these outfits. The Jacobson Air Compressor is the pioneer among automobile garage Compressed Air Appliances. We make a specialty of Air Compressors—small ones at small prices. Write for Bulletin.

Compressors carried in stock by all the leading Automobile Supply Houses in the United States.

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give you the utmost of quality, comfort and service. They alone possess the patented "Rist-Fit." Summer styles have the ventilated back which we originated.

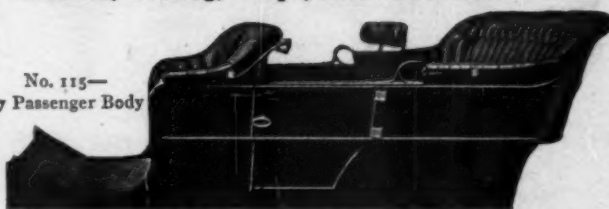
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Runabout, Touring, Coupe, Limousine and Landaulet.

No. 115—
7 Passenger Body



Unequaled facilities for executing orders of any size; in the white or painted and trimmed ready to mount.

The BARNDT-JOHNSTON AUTO SUPPLY CO., 410 Donaldson St., Columbus, Ohio

MICHELIN



Protect Car
and
Passengers



ANTI-SKIDS

BEST
BY
TEST

HARRIS

EVERY
DROP
COUNTS

TRADE MARK—REG. U.S. PAT. OFF.

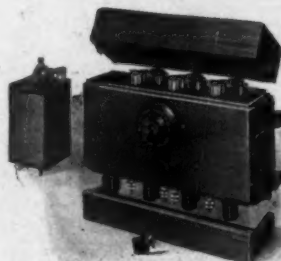
OILS

There is nothing to doubt about their Quality, Efficiency and Economy. Their freedom from deposit on cylinders and spark plugs, and greater mileage per gallon insures more power, least wear and longer life to all moving parts.

All supply houses and garages or direct from
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"H-C" SPARK COILS



are equipped with a combined throw over and polarity switch, which prevents building up on the platinum vibrator points. Also fitted with a safety spark gap within a glass tube which does away with the possibility of shock, and furnishes a reliable means of testing each unit.

Send for New Bulletin 15A7

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BUFFALO IGNITION COMPANY

BUFFALO, NEW YORK

"THE STEADY HAND"



SOME DAY YOU'LL WANT A HOFFECKER

Because it is the acknowledged
AUTHORITY
among Speedometers.
Four years of
DEPENDABILITY
is its record.
Send for catalog of 1910 models

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WOODWORTH TREADS are the only true tire protectors. They never chafe or heat the tires. They are held in place by coil springs along the sides, which automatically take up all slack and prevent any looseness. The protector is always tight and smooth.

No other protector can be fitted in the way that these automatically fit themselves.

They fit all makes of tires—anyone can easily put them on. *Send for Catalogue.*

Leather Tire Goods Co., Niagara Falls, N. Y.
Canadian trade supplied from Niagara Falls, Ont.



The Most Powerful Compound Pump

"STAPLEY" TIRE PUMP

MADE BY BRIDGEPORT BRASS CO.

Price Without Gauge, \$5.00 Price With Gauge, \$7.00

If your dealer doesn't carry it, we will send the "Stapley" prepaid in the U. S. on receipt of price.

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Vanadium Steel

surpasses any other metal for toughness and strength, for shock resisting qualities, for endurance under intermittent or continuous stress, strain or load.

It greatly increases the strength and durability of any Steel, without added weight, in very many cases decreasing it.

Booklet waiting.

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HANG ON TO YOUR OLD TIRES
THEY CAN BE USED FOREVER
WHEN COVERED WITH
STEEL



The KIMBALL STEEL PROTECTOR makes BLOW-OUTS, PUNCTURES, and RIM CUTS impossible. A few sections will hold any old blowout. Tires are as flexible as ever. Send for detailed information.
KIMBALL TIRE CASE CO. 171 BROADWAY, COUNCIL BLUFFS, IOWA



Buy a Shock Absorber that does more than check—

Get one that stops the damaging vibration—one that makes all roads ride like the best roads. A guarantee with each set. Three sizes, \$25, \$40 and \$60.

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WEAR LONGEST

EMPIRE TIRE CO.

Trenton, N. J.

Branches and Agencies Everywhere

KOEHLER'S NEVER BREAK Cantilever Springs

The Ladies' Friend



The One
Neglected
Necessity in
Automobiling

Doubles
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your car as a
"Rest Resort"

Increases the life of your pneumatic tires, also engine and machinery. Rides with more ease than any other spring equipment. Makes it possible to use solid tires with as much comfort as you are now getting on properly inflated pneumatics.

We guarantee to replace all broken parts for one year.

F. J. STEINER, Manager of Sales

UNIVERSAL AUTO SPRING CO., 8500 Florissant Ave.
ST. LOUIS, U. S. A.

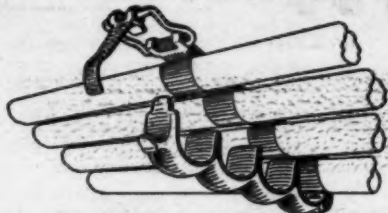
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Make Your Top Last as Long as Your Car

Bair Auto Top Holders (Pat'd)

THEY HOLD THE TOP SECURE

No Jarring
No Jolting
No Chafing
No Rattling
No Broken-bows
No Straps
No Buckles



You have tried the old way of cutting straps in your hurry to raise your top in a downpour of rain—Now try the new way—it's better

Ask your Dealer for a Demonstration or write for Illustrated Booklet "D"

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Put a Casgrain Speedometer on Your Car for 30 Days at Our Expense

Put a Casgrain on your car. Try it out thoroughly. Give it every kind of test. Compare it with any other speed indicator. At the end of a month we know you will want to keep it. Pay for it then, not before. Write for booklet and details of this offer. It is open to every automobile owner.

The Casgrain is guaranteed "for all time."

CASGRAIN SPEEDOMETER

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Patented U. S. A. and all foreign countries

THE AUTOMOBILE AIR SHOCK ABSORBER

is the only mechanically correct shock absorbing device in the world. No liquid or friction to stiffen normal spring play.

The success of the year!
Made for those seeking quality; not price.

Meets all requirements all of the time.

The addition of Kilgore's to your machine means the maximum of comfort, combined with the minimum of expense. 30 days' trial. One year guarantee.

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New York Branch: 1926 Broadway, Room 408.

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We have on hand a number of 6 V. 60 amp. dry type storage batteries, built for us by one of the best known manufacturers. These batteries were built to sell at \$26.00 and are worth the money, but as we have accidentally become overstocked, we offer them while they last at \$12.50.

No better battery is built or sold at any price.

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Established 1876

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Carrosserie Automobile Rothschild & Co.

DESIGNERS AND BUILDERS OF

Artistic Aluminum Coachwork for Foreign and American Chassis.

Special attention given to developing and perfecting original ideas. Dustproof luggage compartments for extended touring

Well equipped repair and storage departments. Estimates submitted.

Entire Plant Devoted Exclusively to Building and Repairing Automobile Coachwork. No Motors Repaired or Sold.

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SPARK PLUGS

\$1.00 BUYS the best spark plug on the market to-day. The plug recognized by engineers everywhere as being mechanically correct. Will spark under any and all conditions—ask your dealer or send for interesting booklet.

JEFFERY-DEWITT CO.
Spark Plug Manufacturers
240 High Street, Newark, N. J.



PROMPT SHIPMENTS OF LITTLE GIANT SHIELDS



COL. JAS. H. SPRAGUE

Demand Swamped us. But we are now able to take care of you. They are automatic.

COME ON

THE SPRAGUE UMBRELLA CO., Norwalk, O.



Pat. July 18, 1899
Can be turned low without carbonizing

Alco German Lava

AMERICAN LAVA COMPANY
P. O. BOX 1180
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Hilo De Luxe

Three Uses to One

Owners of this Invincible Schacht Three-Purpose Car, use it three times as much as they would use any ordinary car. Its value is three-fold, yet its price is but \$850. Dealers have three chances to sell it as against one for any other car. It is a

Runabout, Family Car, and Delivery Wagon in One at \$850



Used as Runabout

Easily changed from one style to another in 5 minutes. As good in each of its styles as any car of anywhere near its price. Prospective purchasers and agents invited to write.

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"FLASH" AUTO-LIGHTER



BATTERY CONNECTION
GAS
OUTLET
GAS INLET

Automatic Ignition of Head-Lights from the Dash-Board, Co-acting Gas Valve and Sparking Switch. Turns on and lights the gas or extinguishes the lights with ONE operation of ONE hand. A Scientific System, simple, efficient, reliable, the component parts constituting an automatic unit. Positive in action. It is the only practical device for the purpose ever put on the market. For particulars address

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\$1,600 CARTERCAR

Model "L" 4-cylinder, 30-35 H.P., 110-inch wheel base, 5-passenger, Friction Transmission, Chain-in-Oil Drive, any number of speeds, will climb a 50% grade with load, including magneto, gas lamps, generator, horn, mats, tools, jack, etc., \$1,600.

Model "H" 4-cylinder, 25 H.P., 100-inch wheel base, Runabout \$1,100. Double Rumble \$1,125. Double Divided Rear Seat \$1,150. Miniature Tonneau \$1,150.

Write for 1910 catalog.
CARTERCAR CO.
PONTIAC, MICH.

Save Your Tires



"INTER-LOCK" INNER SHOE

Equip Your Present Tires with

"Interlock" Inner Shoes

and FORGET Tire Troubles.

Patented

Double-Fabric Tire Company
Auburn, 10 East 7th Street, Indiana

Maxwell Automobiles 1910 Line

Magneto Equipped

9 Models, Prices \$600 to \$1575. Included are model E, 4 cyl.; 30 H.P. touring car, \$1500.

Model Q, 4 cyl.; 22 H.P. runabout, \$900 or light touring car, \$1000.

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PRICE AUTO GLOVES



admit of every adjustment on the second glove you pull on being readily accomplished by the hand already incased in the first glove. The snaps on the gored gauntlet and the automatic solid leather wrist strap may be adjusted without the slightest difficulty. The Price Auto Glove put on and snapped down tight is practically impervious to dust and dirt and in cold weather keeps the hand warm and comfortable from old King Winter's icy blasts.

On request, we will be glad to send our catalog showing the complete line.

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AUTOMOBILE WHEELS

Not the ordinary kind

AUTO-BUGGY WHEELS

Superior in quality and workmanship

35 YEARS, EXPERIENCE IN WHEEL MAKING
CERTAINLY IS AN ADVANTAGE; WE HAVE IT

We would be pleased to figure with you on your requirements

THE TURNBULL WAGON CO.,
DEFIANCE, OHIO.

Please mention The Automobile when writing to Advertisers



RUBBER GOGGLES 50c. PAIR

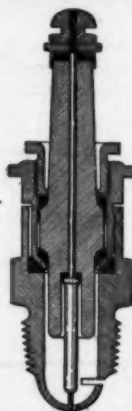
OUR 1910 AUTOMOBILE CATALOG No. 441
contains all the latest and best accessories.

Write for It and Discount Sheet P R.

If you are a dealer, please write on your letter-head and ask for
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New York Sporting Goods Co.

15 and 17 Warren Street, near Broadway, New York



Breech-Block plugs are dress suit plugs.
To clean, just snap off the clip, take out
the plug with its entire porcelain exposed,
wipe it off with a twist to the whiteness of
snow, and drop it back. Time 6 seconds.

"Breech-Block"

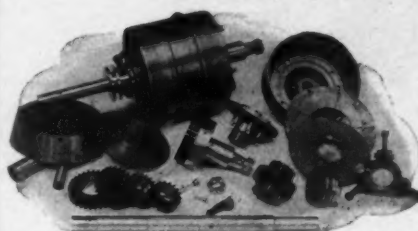
Breech-Blocks are interchangeable. You
can pick out a mica plug and drop in a porce-
lain, or change them in an instant without
stopping the engine, if an extra plug is handy.

Breech-Blocks are supplied in standard
threads. Porcelain, \$1.50; Mica, \$1.75.
At all dealers. Send for booklet.

Earl Canedy

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25 H. P. PLANETARY TRANSMISSION
Showing both Disc and Cone Type Clutch.

Steering Gears
Transmissions
Differentials
Clutches
and
Control
Levers



THE "BULL DOG" CARBON REMOVER DOES THE WORK IN A PRACTICAL WAY

This is without question the *only* Carbon Re-
mover on the market (for vertical 4 cycle poppet
valve engines) that knocks off the hard dry "bar-
nacles" which form on the piston heads and cylin-
der walls. It *only* takes a few minutes, makes the
chamber absolutely clean, and positively will not
injure the engine.

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E. S. Michener,
Dear Sir:—I used your "Bull Dog" Carbon Remover in
my "WINTON" Car with great satisfaction; it cleans out the
carbon like magic. It is as simple as ABC to operate and is the
best thing for cleaning out carbon that I ever used.

Yours very truly,

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Price 75c. Postpaid—Check or Money Order

E. S. MICHENER,

80 Washington St., NEW CASTLE, PA.

COLE 30-\$1500.

Don't select your car on a "price tag" basis. Look
INTO the car before you look AT the price. Learn
what service the CAR will give before you decide what
price YOU will give. That is the kind of investigator
that sells the Cole "30." One chassis—four bodies

Cole Motor Car Co., Indianapolis, Ind.



Write for
Catalog

Torpedo Roadster

Some
Territory open
for Agencies

Good Bye, Vulcanizing!

Your two hands and



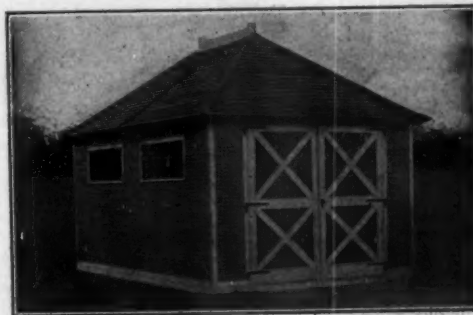
Trade Mark

are all you need to repair the worst puncture or blowout. It *kneds* into and becomes
as tough as the tire and equally elastic. Repairs tubes or casings. Send \$2 for complete
outfit on free trial. Money back if you ask for it. Circular free on request
Dealers wanted everywhere.

ATLAS AUTO SUPPLY CO., 28 East Adams Street, CHICAGO

A Private Garage is the Safe Deposit Box for your Machine

You would not leave your jewels or watch
subject to the same use and abuse that you
do your machine in a Public Garage.



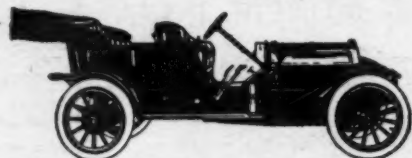
Your Greatest Investment
is in the machine.
Your Greatest Expense
is operating and maintenance.
Your Greatest Annoyance
is tiresome waiting for service and the disputes
over monthly bills.
Your Night Mares are Joy Rides.
Why Not Save All These?
Own your own garage.
We Make Them

They fulfill all the advantages of the Public Garage
with none of the attendant disadvantages.
Send for Free Catalog
which shows different styles of Garages and Summer
Cottages.

SPRINGFIELD PORTABLE HOUSE CO.

412 Allen Street, SPRINGFIELD, MASS.
810 Pulitzer Bldg., NEW YORK CITY

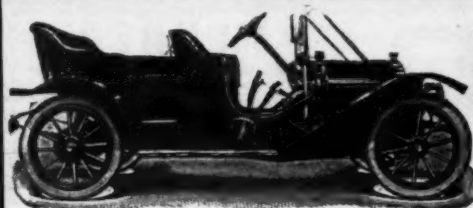
STAVER - CHICAGO



5-PASSENGER TOURING \$1600

The Staver-Chicago 5-Passenger Torpedo at \$1850 and the Touring Car at \$1600 will give you a decided advantage over your competitor who can only supply their equal at a much higher price.

STAVER CARRIAGE CO., 76th & Wallace Sts., CHICAGO, ILL.



MIDLAND
1910

Model L-4-40

Unusual Cars at Common Prices

Big Power, Big Tires, Big Cars—each model of the Midland is a leader in its respective class.

Model L—40 Horse-Power Cylinders 4½" x 5", Wheel Base 115", Tires 34" x 4", Toy Tonneau or Roadster with Trunk.

Model K—50 Horse-Power, Cylinders 4½" x 5½", Wheel Base 118", Tires 36" x 4", Touring Car or Demi Tonneau. Write for free booklet.

MIDLAND MOTOR CO.,

MOLINE, ILLINOIS

=Pierce-Racine=

The Car With A Famous Engine

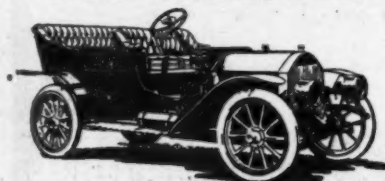
You will have to look to the high priced American and Foreign Cars for the same value you can get in a Pierce-Racine at

\$1750

If you were to pay \$4000 for a car you could not get a more satisfactory motor or an easier running car. Send for catalog to-day.

PIERCE MOTOR CO.

100 22d St., Racine, Wis.



Most Critical Buyers Become Enthusiasts

Men who investigate all cars become most enthusiastic over the HENRY. Close comparisons prove it to be the greatest dollar-for-dollar automobile value today.

The Henry "35"

Built to Sell on Its Merits at \$1,750

Touring Car or Pony Tonneau. Large motor, long wheel base, roomy tonneau, full-floating rear axles, extra long rear springs.

Write for details.

THE HENRY MOTOR CAR CO.

Station F

MUSKEGON, MICHIGAN

THE BEST ADVERTISING CHASE MOTOR WAGONS

get is the word of mouth advertising of satisfied users.

Read what Mr. Turver, Western Sales Agent for Shredded Wheat Biscuit, has to say about the CHASE WAGON in use on his territory.

Chase Motor Truck Co.,

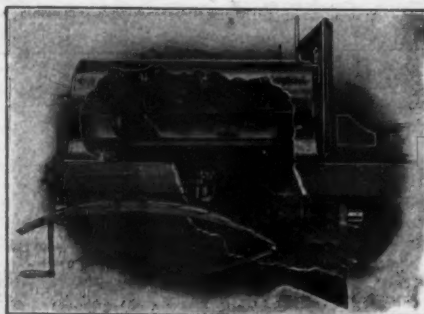
St. Paul, Minn., May 26, 1910.

Mr. George Gerem, Twin City Representative, St. Paul, Minn.
Dear Sir: I am pleased to report that the Chase Motor Wagon, purchased from your Company this spring, has been in operation every day since received, and is giving excellent service. Our experience has been most satisfactory, and the expense of operation has been a revelation. We operate the car six days a week, and from ten to twelve hours per day, and our gasoline consumption per week is from 12 to 15 gallons, which compared with the boarding expense of a team of horses without considering the work done, is greatly in favor of the Chase Motor Wagon. This saving in delivery expense is one which should commend itself to every wide-awake merchant. Aside from the cost of gasoline, oil and dry cells for battery, we have had no expense whatever for repairs. In a short time I expect to send this motor wagon through western Minnesota and eastern South Dakota and shall be pleased to report to you our experience on this trip. Wishing you all success in the sale of your excellent commercial wagon, and with kind regards, I am yours truly, R. H. TURVER, Sales Agent Shredded Wheat Biscuit.

We have built Commercial wagons for every conceivable purpose. Tell us the use to which you would put a wagon and we will tell you just what success it has met in your particular line.

Chase Motor Truck Company

Tully Street
SYRACUSE, N.Y., U.S.A.



The Car of Constant Service.

Our 1910 Catalogue E sent on request.

THE CORBIN MOTOR VEHICLE CORPORATION,
NEW BRITAIN, CONN.

Licensed under Selden patent



VICTOR SIGHT SEEING CARS

are built to run at all times, under all conditions. Gasoline—Electric—Open—Enclosed. Write for particulars—Some Territory still open.

VICTOR MOTOR TRUCK COMPANY

651 Main Street,

Buffalo, New York

The KLAXON

"The X Ray of Sound"

Not a toy

Not meant to be "played with," but

A powerful long-range signal with a definite use and purpose.

No other automobile signal approaches the KLAXON in loudness. Both the volume and the harshness of the tone class it as a country rather than a town signal.

Yet these very qualities—unnecessary at close range—make the KLAXON absolutely ideal for distance signaling. And they are particularly valuable to warn the possible driver unseen around a blind crossing or a bush-hidden bend in the road.



Type L Klaxon, \$35.00

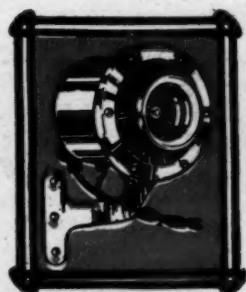


Type S, with short projector, \$30.00

It is both pleasanter and safer to give the other fellow time to make way in comfort. There are times when it is positively dangerous not to, as every motorist knows.

That harsh tone has a purpose, too. It makes people "take notice" far more promptly than a musical signal. It is in itself a warning. The hearer doesn't stop to interpret it—he acts at once and unconsciously.

Ask your dealer. And send for catalog.



KLAXONET

LOVELL-McCONNELL MFG. CO.
MANUFACTURERS
NEWARK, N. J.

THE KLAXON COMPANY
SOLE DISTRIBUTORS FOR U.S.A.
1 Madison Avenue, NEW YORK

KLAXON

"The X Ray of Sound"



KLAXON

Please mention The Automobile when writing to Advertisers

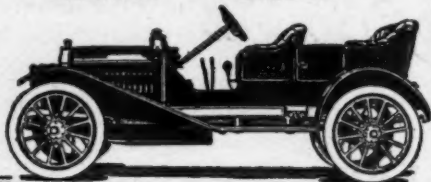
Warren-Detroit "30"

Standard Construction but MORE than Standard VALUE

A strictly high-grade car with strictly high-grade features. 110-inch wheel base. Sliding Gear Selective type transmission—three speeds forward and reverse. Cone Clutch; Double Ignition system Deliveries prompt. Write for full information.

Roadster \$1100. Demi-tonneau \$1250
32x3-1/2 tires 34x3-1/2 tires

Warren
Motor Car
Company,
Detroit, Mich.

**MERCER** Touring Car.
Toy Tonneau. Speedster

Each
\$2150



1911
Models
Now
Being
Shipped

Style, Luxury, Quality Strength, Speed.
Made Right and Stays Right.

Let us hear from you.

MERCER AUTOMOBILE CO., - - - Box 126, TRENTON, N. J.

\$2500 Speedwell "50"

THE Speedwell's first appeal is to the man who has owned and driven motor cars for which he paid \$3500 or \$4500. He will recognize at once its equality with these other fine cars.



Model 10-B 5-Place Touring Car.
Completely equipped except tax, \$2,500

Arrange for a Speedwell demonstration; and write for the literature.

THE SPEEDWELL MOTOR CAR CO., 10 Essex Avenue, Dayton, Ohio.
Licensed under Selden Patent

Badger 30-\$1600.00

112" W.B.; 34" wheels; Q. D. rims; Bosch dual ignition with storage battery; selective type transmission; Brown-Sharp gears; F & S ball bearings. Write for our very liberal agency proposition.

Badger Motor Car Co., Columbus, Wis.

The McIntyre

The Most for the Money
and All of It Good



MANY MODELS
PLEASURE AND COMMERCIAL

W. H. McINTYRE COMPANY, Auburn, Ind

Licensed
under Selden
Patent

1730 Grand Avenue, Kansas City, Mo.
Tudhope-McIntyre Co., Orillia, Ont., Canada
1334 Nicollet Ave., Minneapolis, Minn.

K-R-I-T

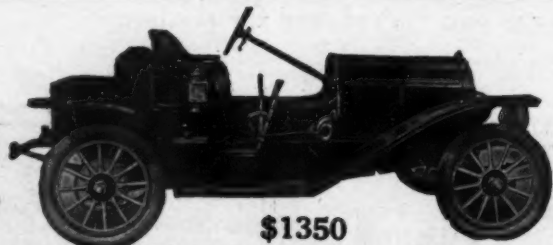
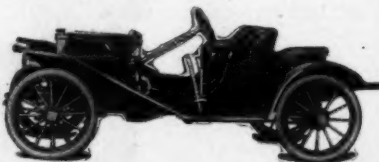
"The car with
the invisible
start."

96 in. wheel base 22 1/2 H.P. \$800
32 in. wheels

Sliding gear transmission. Multiple disc clutch.
Weight, 1200 lbs.

Runabout \$800.
Roadster \$825.
Surrey \$850.

Write for Catalog
K-R-I-T Motor
Car Co.
DETROIT



\$1350

1910 Petrel Roadster 30 H. P.—4 Cylinder—108 inch Wheel Base
PETREL 1910 MOTOR CARS New Management
Capacity Doubled
"THE ARISTOCRAT OF MEDIUM PRICED CARS"

If the Petrel is not represented in your vicinity, write us—today—before the opportunity is gone. Immediate delivery.
Former agents can renew contracts with new management.

PETREL MOTOR CAR CO., Milwaukee, U. S. A.

AGENTS WANTED

Washington



D. W. F. HESS-BRIGHTS
VANADIUM STEEL

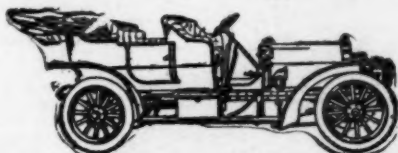
Every owner satisfied. MORAL: Buy a Washington.

CARTER MOTOR CAR CORPORATION, Munsey Bldg., WASHINGTON, D. C.
Factory—Hyattsville, Md.

Ten thousand people
are daily engaged in selling
E-M-F "30" and FLANDERS "20" CARS
—largest sales force
and the cheapest—for
they all work for love.
They are satisfied owners.



The Most Perfect Shaft Driven
Automobile Built in America



PENNSYLVANIA AUTO MOTOR CO.
BRYN MAWR, PA.

Studebaker

**GASOLINE CARS
ELECTRIC PLEASURE VEHICLES
ELECTRIC POWER WAGONS**

Studebaker Automobile Co.

Factory and General Offices

SOUTH BEND, IND.

All that
the Name
Signifies



**Sets a Higher
Standard**

In Automobile Building

Durable, Reliable, Powerful
and Speedy. Noted for its
Broad Range of Control: 4 to
65 Miles per Hour on High
Gear. 124-in. Wheel Base, 50
H.P., Shaft Drive, Dual System
Ignition—Magnet and Battery.

Agents wanted in unassigned territory.
Catalog mailed on request

\$3,000, in either miniature tonneau,
touring or roadster bodies, including
FULL EQUIPMENT.

St. Louis Car Co. (Auto
Dept.)
5202 N. Second St., St. Louis, Mo.

**YOU CAN SAVE one-third if you
purchase on the METZ PLAN**

\$378.00



buys a smart prac-
tical car that will
take you any-
where.

Bosch Magneto.
Clincher Tires
Lamps and Horn.

Write for Book "H."

METZ COMPANY, Waltham, Mass.

Write for complete information
about the

Abbott-Detroit

The car with a pedigree

Abbott Motor Co.

595 Beaufait Ave.,

Detroit, Mich.

Dorris

PRICE, \$2500
INCLUDING

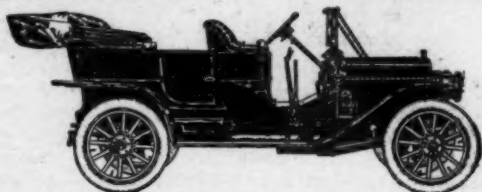
TOP
TOOLS

WINDSHIELD

PRES-O-LITE TANK

SPEEDOMETER

TIRE IRONS



Licensed under Selden Patent
DORRIS MOTOR CAR CO.

ST. LOUIS, MO.

1916 Paterson "30"
\$1400

4-Cylinder 30 Horse Power

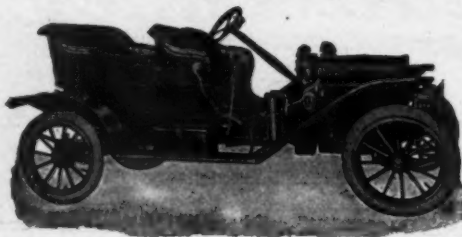
Write for Agency
Proposition

**W. A. PATERSON
COMPANY**
FLINT, MICH.

Please mention The Automobile when writing to Advertisers

Cameron Sixes

\$1250 to \$1500



Cameron
Fours

\$850 to
\$1100

Write for
Literature

CAMERON CAR COMPANY, Beverly, Mass.

Investigate This Remarkable \$1275 DE TAMBLE

Specifications: 4 cycle, 34 h. p.; transmission and engine in a single unit, on 3 point suspension; 115-inch wheel base, 34-inch wheels; 5 passenger touring body; clearance 10½ inch; top of frame 21 inches from the ground (lowest hung standard touring car in the market); magneto, full lamp and tool equipment.

A few more live dealers can secure the agency for this quick-selling car

CAR MAKERS SELLING CO.

1256 Michigan Avenue, CHICAGO

Baker Electric

The Only Electric with Bevel Gear Shaft Drive

Write for Booklet "A Retrospect and A Forecast" that gives the facts about the Shaft Drive.

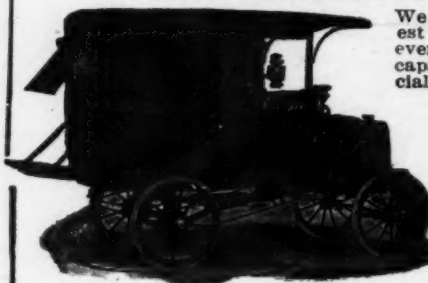
THE BAKER MOTOR VEHICLE CO.

29 West 80th Street

Cleveland, Ohio.

Commercial Power Wagons

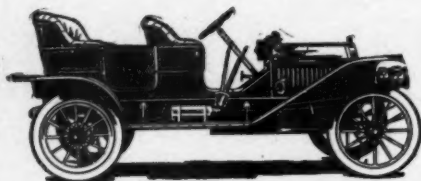
1910 Announcement



We manufacture the highest grade motor wagons ever produced—1000 pounds capacity only—we are Specialists in this particular line. Our entire new factory is producing only this one Chassis. We furnish bodies to suit any business.

Hart-Kraft Motor Co.
YORK, PENNA.

"CLARK CARS" 30 H.P. \$1400 40 H.P. \$1750



Good
territory
open for
live dealers.

Write for
specifications.

General Sales Agents:

The MEIXELL-DOWNING COMPANY

505 Odd Fellow Building, Indianapolis, Indiana

CLARK MOTOR CAR CO., Manufacturers, Shelbyville, Ind.

THE Detroit ELECTRIC

Look always to the motor—be sure of that one feature before you buy an electric. The Detroit is the only electric equipped with a motor produced by the builder of the carriage, and built by men long experienced in building nothing but electric vehicle motors.

Before you buy, write for the Detroit literature.

ANDERSON CARRIAGE COMPANY, Sta. C, Detroit, Mich.

The Only Car of Established Reputation
Selling at a Moderate Price.

HAYNES

Station B

Kokomo, Ind.

Licensed under Selden Patent

1910 F.A.L-CAR 35-40



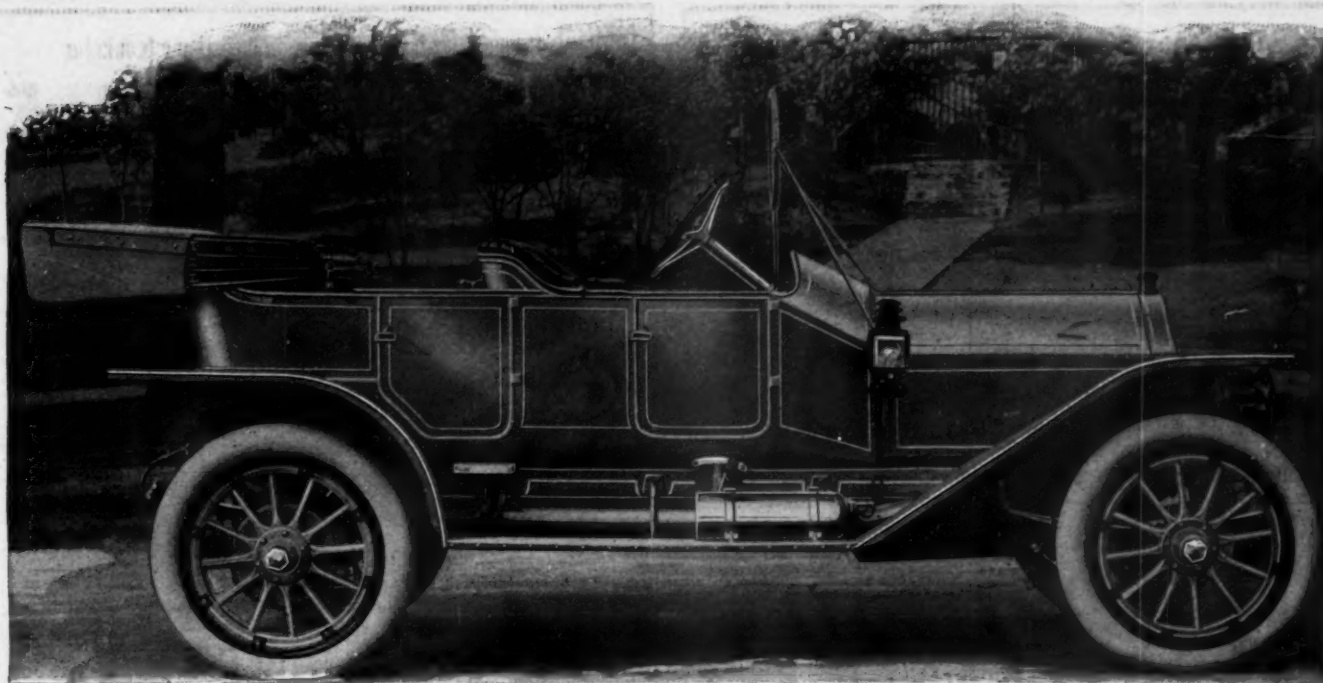
One Chassis

\$1750.00

Three Bodies

Fal Motor Company, Nos. 163-175 N. May St., Chicago, Ill.

Please mention The Automobile when writing to Advertisers



40 H.P. **NEW Torpedo Model 34, With Special Equipment**
SPECIAL EQUIPMENT MODEL 34. Spanish Leather Upholstering. Demountable Rims. Prest-O-Lite Tank. Solar Headlights, Black Enameled. Combination electric side and tail lamps, Black Enameled. Storage Battery. Exhaust Horn. Tire Irons. Foot Rail. Rode Rail. **\$2,000**

World's Two Greatest Automobile Values Now Ready for Delivery!

WHEN you buy a car you buy Performance, Durability, Comfort, Economy and Style. The car whose price is so high that its merit cannot possibly equal the price, is being sold upon other than a value basis. In the Inter-State you get maximum value, dollar for dollar. **Actual records** and specifications **prove** that the Inter-State at these prices offers far the greatest value on the market today!

Two NEW Inter State "40" Models

The Inter-State of 118" wheel base is the maximum value at \$1750 by reason of its long wheelbase and a forty horsepower motor with 4½" bore by 5" stroke, built entirely in the manufacturers' own plant.

A better car cannot be built to sell at \$1750 that has the fine finish, the durability, the artistic harmony and the smooth riding qualities of the Inter-State.

Even in the highest priced cars you will not find one that has all the following features of the Inter-State—a double ignition system; a rolling push rod contact on the cam shaft; integral water pump, oil pump and an imported high tension magneto, all located on one side of the motor

and driven by one shaft. And you can find none whose parts are so easily accessible.

You can find no other motor embodying only the best features of modern motor car practice that is as simple in design as the Inter-State motor.

Upon inspecting the entire chassis, which is the most important part of any car, and comparing it point by point, you will find that no other car at anywhere near the same price has the same refinement, the same high quality of materials and superior workmanship as is found in the Inter-State. And you will find in this car a new high standard of interchangeability of parts.

The Inter-State stands second to none on long, severe service. It is the **one** car that offers you **all** of the above features in **addition** to the regular standard practice.

Dealers Are Enthusiastic!

The following telegram is a concrete example of the many enthusiastic compliments that we have received on the unparalleled merit of the new values which we are now offering:

Providence, R. I., May 20, 1910.

Inter-State Automobile Co., Muncie, Ind.

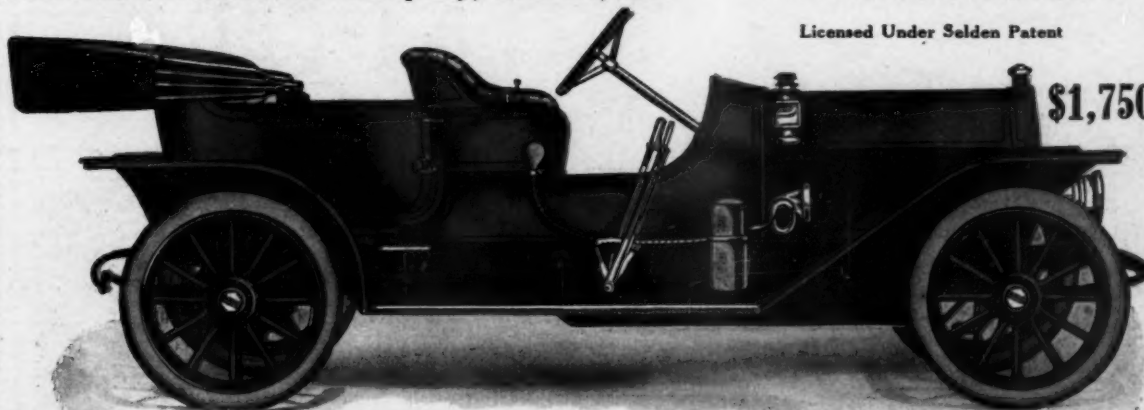
Congratulations on Torpedo. Handsomest car under four thousand dollars. Oh, so silent; not any vibration. Comments galore.

C. H. GOODWIN.

Inter-State Automobile Company, Muncie, Ind.

Write for Information Regarding Choice Territory for Dealers

Licensed Under Selden Patent



\$1,750

NEW Model 31A Inter-State "40"—Demi-Tonneau

Send for New Book!

It illustrates cars in exact colors. It tells all about the many high-class features we haven't room here to tell about and describes every part of the Inter-State in detail. Just fill out the coupon

Tear This Out!

A Reminder

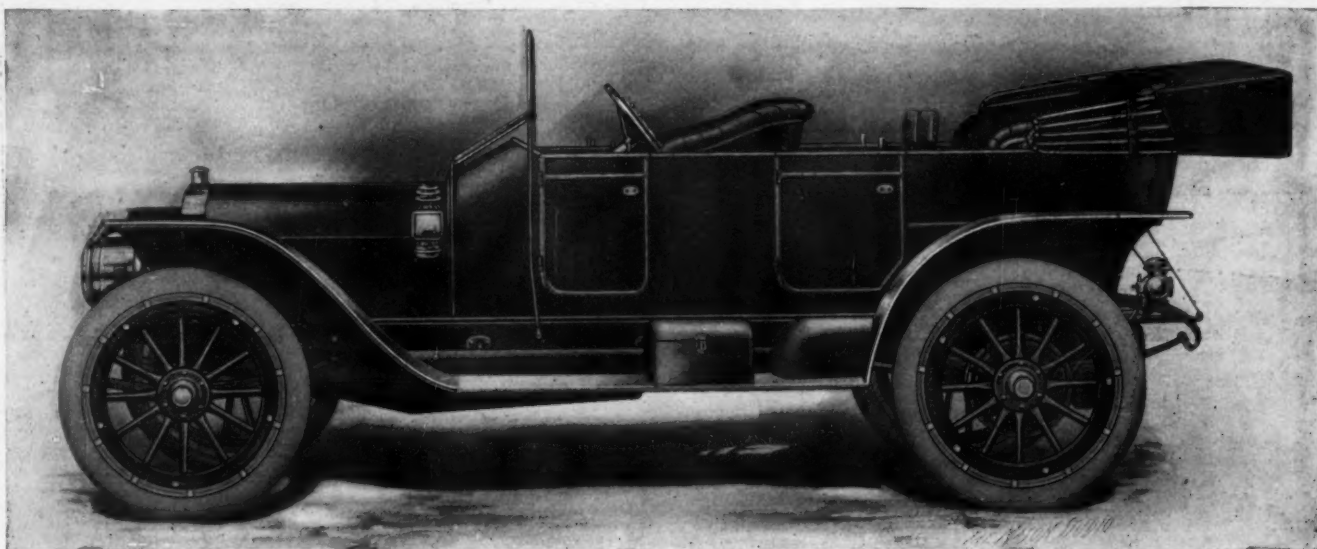
Inter-State Automobile Co., Muncie, Ind.

You may send your new 1910 book.

Name.....

Address.....

.....(48)



Model "R" Four-40 Touring Car, Series B, Price \$3,500.00

Knox

**1911
SERIES**

1911 ANNOUNCEMENT

Four Cylinder 40-H. P.

Six Cylinder 60-H. P.

**STANDARD AND TORPEDO TYPE TOURING CARS, 5 and 7 passengers.
CLOSE COUPLED TYPES.**

LIMOUSINES AND LANDAULETS.

Made with detachable front seat doors.

TONNEAUETTES with Torpedo type front, high doors, made with tonneau detachable.

RACEABOUTS made with or without Torpedo front and high doors.

TORPEDO TYPES, 4 and 6 passengers; the most beautiful car of this type ever put on the market.

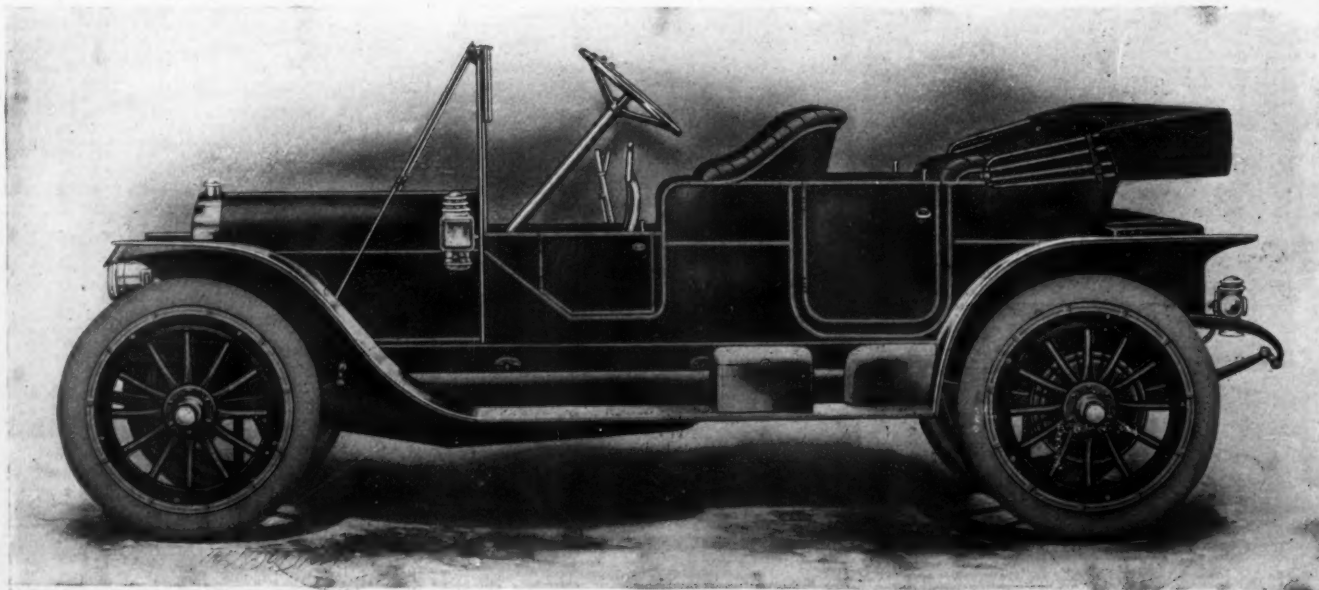
**KNOX TYPES OR FEATURES OF CONSTRUCTION
ARE ORIGINAL, NOT COPIES.**

KNOX AUTOMOBILE COMPANY

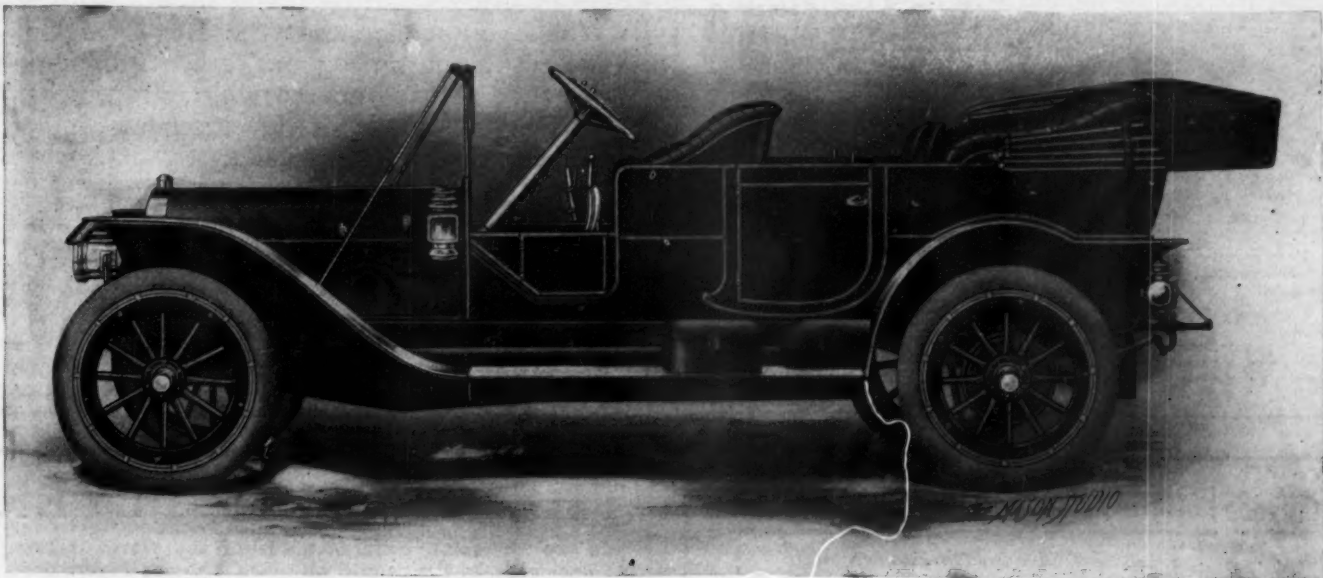
Licensed Under Selden Patents.

SPRINGFIELD, MASS.

Model "R" Four-40 Close Coupled, Price \$3,250.00



Please mention The Automobile when writing to Advertisers



Model "S" Six-60 Touring Car, Price \$5,000.00



Up-To-Date in Types and Construction
Advance Information on Request

Our agency proposition for unoccupied territory is interesting.

Deliveries begin July 15th.

All types fully equipped.

WRITE US.

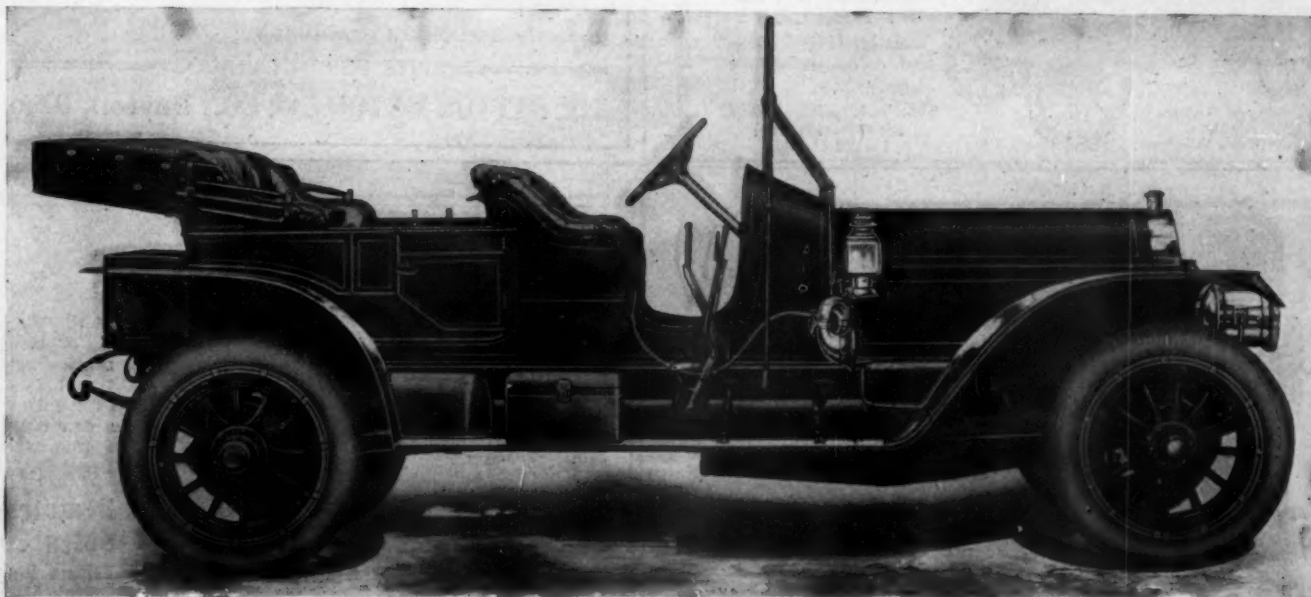
1911
SERIES

KNOX AUTOMOBILE COMPANY

Licensed Under Selden Patents.

SPRINGFIELD, MASS.

Model "S" Six-60 Tonneauette, Price \$4,900.00



Please mention The Automobile when writing to Advertisers



VAN DYKE \$750 Delivery Wagon

Viewed from any standpoint—as a prospective purchaser or a dealer in commercial cars—you can't match the "VAN DYKE" quality, the "VAN DYKE" efficiency, design, simplicity of construction, ease of operation, economy of up-keep or durability. In fact, **VAN DYKE DELIVERY WAGONS**

are in every feature incomparably superior to any commercial cars yet designed.

Investigate, write us and we will supply you with information which will prove a revelation to you.

THE VAN DYKE MOTOR CAR COMPANY, Dept. C, DETROIT, MICH.

When you realize that the Regal "30" is the result of *three years' concentration* on one type of car you see why it represents the highest point of development among medium-priced automobiles.

Regal 30 with magneto \$1250

The Regal Motor Car Co.

Licensed under Selden Patent.

Detroit, Mich.

Pullman Performances Prove Its Perfection

(Licensed Under Selden Patent)

As a Reliability Car the Pullman Acknowledges no Superior

In the Atlanta-New York Good Roads Tour, June 6-14 (1100 miles) a model K, 35 H. P. \$2000 Pullman in competition with cars varying in price from \$2001-\$3000 **made the only perfect score in Class 5.**

Pullman Motor Car Company, York, Pa.

Dealers: Write for 1911 Proposition.

THE THOMAS FLYER

Is the champion endurance car of the world. Over 80 per cent. of the people who own Thomas Flyers previously owned other cars. They were in a position to appreciate automobile values. The Thomas Flyer is now their unqualified choice.

The E. R. Thomas Motor Company maintains a force of traveling experts who periodically call upon every Thomas owner and make sure that his car is in good condition. Let us send you some of the letters from our owners and some of our interesting engineering literature.

E. R. THOMAS MOTOR CO., Buffalo, N. Y.

(Licensed under Selden Patent)

Go After the Team Users!

Sell one a

Monitor Commercial Car

and you're bound to sell the rest.

SPECIAL OFFER TO DEALERS

Write for 1910 Catalog and particulars of our Agency Offer.

MONITOR AUTOMOBILE WORKS
208 N. Academy Street
JANESVILLE, WIS.



Designed Right.
Built Right.
Priced Right.

ALL CARS EQUIPPED WITH VALVE-IN-HEAD MOTORS

Stoddard-Dayton

Touring Cars, Roadsters, Runabouts, Town Cars, Landaulets and Limousines. Choice of 30 Styles of Body and Body Combinations.

—WRITE FOR '10 CATALOG—

THE DAYTON MOTOR CAR CO., Dayton, Ohio

FULLER

Line is COMPLETE

2-cylinder and 4-cylinder models of the latest and most approved construction, soundly and carefully built, high-class in every respect, splendid in appearance, and sold at the remarkably close prices **\$825 to \$1165.**

Let us tell you more about our product and its possibilities

FULLER BUGGY CO., Jackson, Mich.

Licensed Under Selden Patent

The Runabout you have been waiting for

THE DEMOT-CAR

\$550 including magneto



For information relative to car or agency arrangements, write Dept. D.

Demotcar Sales Co.
Tolsma Bldg.
Detroit, Mich.

